

## A revision of *Blastus* Lour. (*Melastomataceæ*)

C. HANSEN

**Summary :** The genus *Blastus* Lour. comprises twelve species, one of which is first described here, and three varieties (the new combinations *B. borneensis* Cogn. var. *eberhardtii* (Guillaumin) C. Hansen, var. *stellulatus* (Geddes) C. Hansen and var. *pulverulentus* (Ridley) C. Hansen). Additional two species are ranged as doubtful, and among the excluded names *B. hispidissimus* Ridley is transferred to *Anerinckleistus* (*A. hispidissimus* (Ridley) C. Hansen, *comb. nov.*). All taxa are thoroughly described and entered in keys. The species are illustrated by herbarium specimens, most also by one or several floral parts and a few by SEM photographs of their seeds, and their distribution is shown on maps.

**Résumé :** Le genre *Blastus* Lour. comprend douze espèces (dont une est décrite ici), ainsi que trois variétés (les combinaisons nouvelles *B. borneensis* Cogn. var. *eberhardtii* (Guillaumin) C. Hansen, var. *stellulatus* (Geddes) C. Hansen et var. *pulverulentus* (Ridley) C. Hansen). Deux autres espèces sont traitées comme incertaines. Parmi les noms exclus, *B. hispidissimus* Ridley est rapporté à *Anerinckleistus* (*A. hispidissimus* (Ridley) C. Hansen, *comb. nov.*). Tous les taxons sont complètement décrits et identifiables grâce à des clés. Les espèces et variétés sont figurées par des échantillons d'herbier, la plupart aussi par des parties florales et quelques-unes par des photographies des graines au MEB. L'aire de toutes les espèces et variétés est présentée.

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### INTRODUCTION

The Asiatic genus *Blastus* Lour. is distinct in the *Oxysporeæ* by having only four stamens and by its peltate glands, which occur on all vegetative parts and on various floral parts. The glands are absent in one species, otherwise they make it possible to refer sterile specimens and often even fragments of specimens to the genus.

*Blastus* is related to *Allomorpha*, *Oxyspora*, *Bredia*, *Anerinckleistus*, *Driessenia* and *Neodriessenia*, but is apparently no closer related to one than the others.

*Blastus* occurs in Assam, Yunnan, Kweichow, Kwangsi, Kwangtung, Fukien, Hainan, Taiwan, Ryu-Kyu Islands, Laos, Vietnam, Peninsular Thailand, Malay Peninsula, Sumatra, Borneo and Celebes.

### COMMENTS

The characteristic peltate glands in *Blastus* are composed of several to many radiating cells forming a disc which is fixed centrally. Very rarely the glands become stipitate as

on the hypanthium of some specimens of *B. pauciflorus*. Usually the glands are hyaline, but sometimes they become opaque, at least on dried specimens. Usually they are some shade of yellow, but in *B. borneensis* they often are wine-red.

The glands in *Blastus* differ from similar glands elsewhere in having more than ten radiating cells. Within the genus they are of little taxonomic use. In *B. cavaleriei*, *B. multiflorus* and *B. thaiyongii* the glands have 11-20 radiating cells and crenate margin, while in the remaining species they usually have 30-50 radiating cells and entire or at most crenulate margin.

The leaves in a pair usually are unequal in size, often in a pattern so that in every second leaf-pair of a twig the leaves are almost equal, and in every second they are much unequal. The larger leaf of a pair is 1-1.5, rarely up to 5, times, longer than the smaller.

Only the episeptal whorl of stamens is found in *Blastus* (Pl. 1, 1). No traces of an epipetalal whorl are seen. The connective is usually indistinct. Below it forms the dorsal and basal part of the anther sacs and even exceeds them in *B. borneensis* var. *pulverulentus*, *B. pauciflorus* and *B. auriculatus* (Pl. 2, 5, 7).

*Blastus* belongs to the genera, in which the placentas do not protrude on stalks into the loculi of the ovary, but are sessile and form together with the central vascular strands a column squarish in cross section (Pl. 1, 3, 5). When the fruits dehisce the column disengages and persists even in old fruit (Pl. 1, 4, 5, 7). In fruit it is easily seen that the placentas make up usually only part of the column (Pl. 1, 2, 4, 7). Often they do not form neither the basal nor apical part of it, but these are composed only of the persistent vascular strands. When the placentas do not extend to the apex I have termed the column beaked.

The hypanthium makes part of the fruit at least until dehiscence (Pl. 1, 2, 5, 6, 7). The capsule dehisces apically and laterally, but the valves remain fixed basally, bending outwards in varying degree. In *B. borneensis* only slightly so that the hypanthium remains intact even in old fruit (Pl. 1, 7). In most other species so much that the hypanthium breaks away partly or totally, at least in old fruits (Pl. 1, 4, 5).

The seeds of *Blastus* are oblong with a more or less distinct beak at chalaza usually with a more or less distinct furrow along raphe, which is, however, often filled with the strophiole cells (Pl. 3). As such they resemble seeds elsewhere in the *Oxysporeæ* and *Sonerileæ* (species of *Allomorpha*, *Anerinleistus*, *Oxyspora*), so that *Blastus* cannot be recognized by means of its seeds. That seems to be no exception in the two tribes where so far only *Barthea*, *Ochthocharis* and *Sarcopyramis* are known to have generically distinct seeds (HANSEN, 1979, 1980; HANSEN & WICKENS, 1981). Occasionally in the tribes the seeds appear to be characteristic for a species, so that it can be recognized from any other species. *B. cochinchinensis* is an example (Pl. 3). In *Blastus* itself, in addition to this, *B. multiflorus* and *B. squamosus* can be recognized by their seeds (Pl. 3, B, D). The seeds of the remaining species resemble the seeds of *B. borneensis* and *B. pauciflorus* (Pl. 3, A, E). In all except *B. borneensis* there is a tendency to develop bullate protuberances. The seeds of *B. mollissimus* and *B. auriculatus* have not been examined.

## BLASTUS Lour.

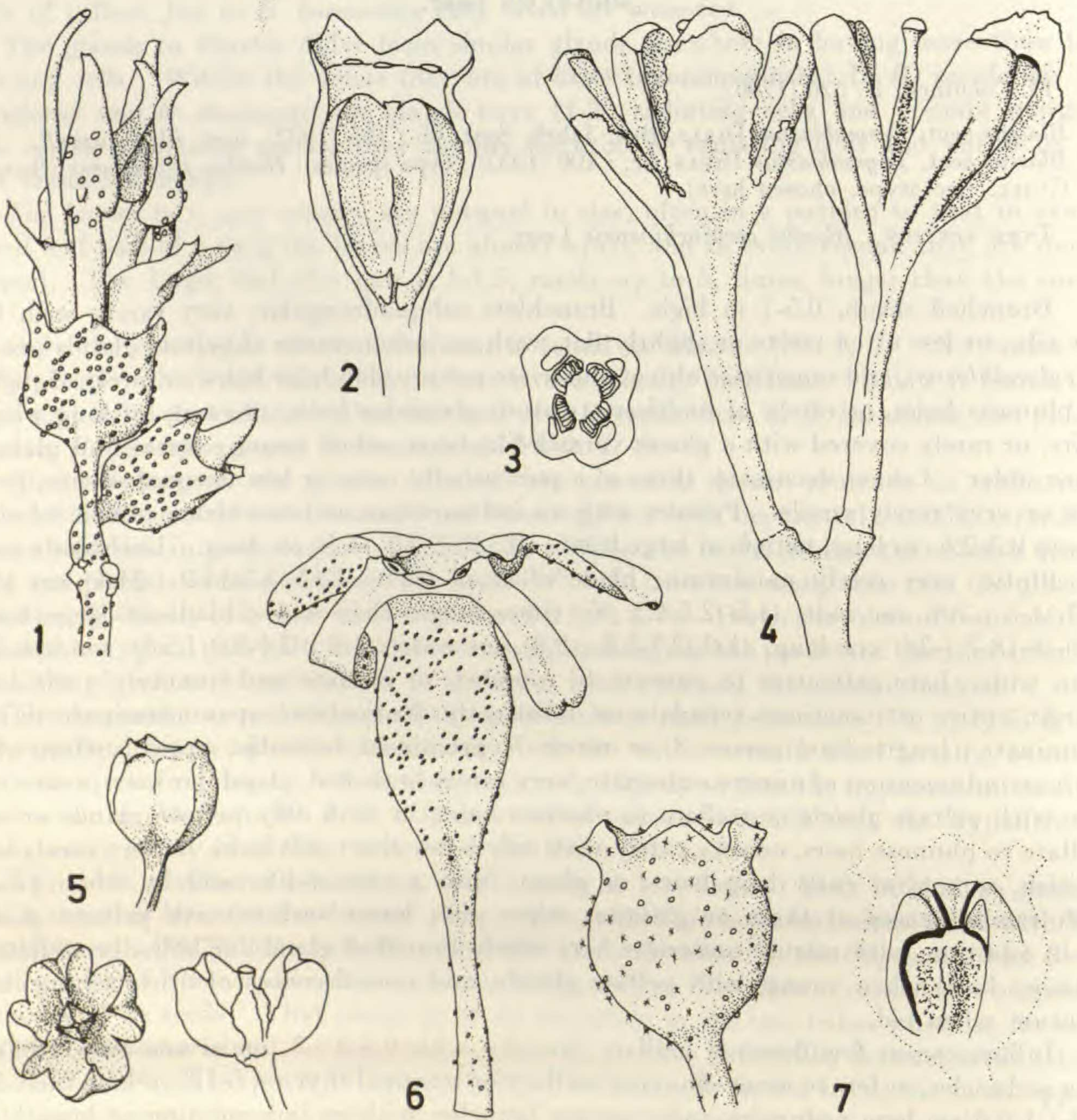
Fl. Cochinch. 1 : 526 (1790).

- *Blastus* sect. *Desmoblastus* DIELS, Bot. Jahrb. Syst. 65 : 105 (1932), *nom. illeg. superfl.*
- *Blastus* sect. *Thyrsoblastus* DIELS, *l.c.* : 106 (1932); type species : *Blastus pauciflorus* (BENTH.) GUILL. (lectotype, chosen here).

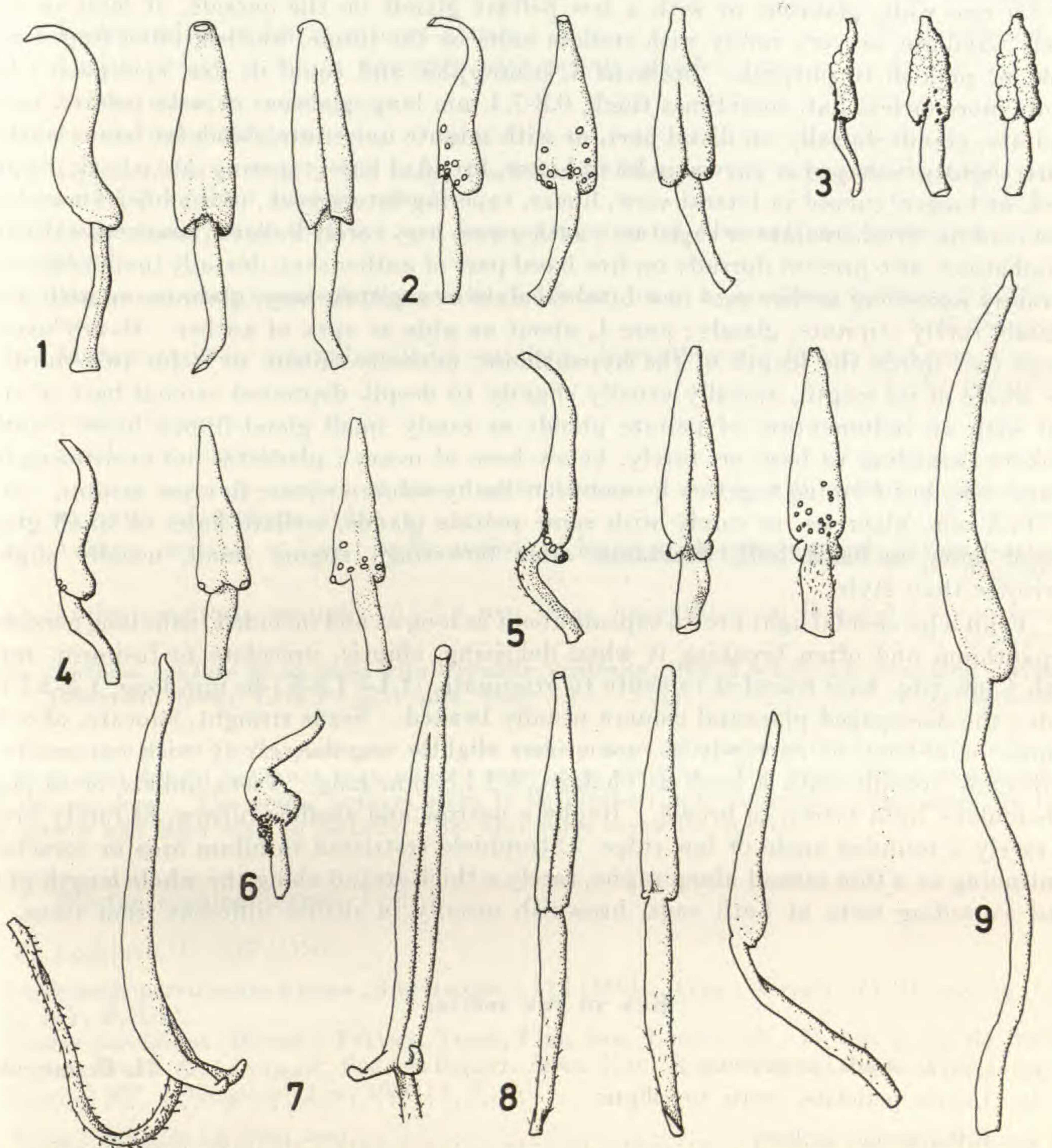
TYPE SPECIES : *Blastus cochinchinensis* Lour.

Branched shrub, 0.5-7 m high. Branchlets subquadrangular, very rarely with four low ribs, or less often terete or slightly flat, with an indumentum of peltate glands (except *B. eglandulosus*), and sometimes also of uniseriate minute glandular hairs, or rarely of stellate to plumose hairs, or rarely of multiseriate stout glandular hairs, or rarely of long whitish hairs, or rarely covered with a glossy varnish-like layer, when young; terete and glabrous when older. Leaves decussate, those of a pair usually more or less unequal in size, petiolate or very rarely sessile. Petioles with an indumentum as branchlets; petiole of small leaves 0.3-2.6 cm long, petiole of large leaves (0.5-)0.8-2.7 (-5.5) cm long. Leaf-blade ovate to elliptic, very rarely pandurate; blade of small leaves (2.2-)3.3-14.2 (-21.4) cm long, (0.7-)1-5 (-7.8) cm wide, (1.5-)2.5-4.1 (-5) times longer than wide; blade of large leaves (4.6-)8-18.7 (-28) cm long, (1.6-)2.7-5.8 (-9.8) cm wide, (1.8-) 2.4-3.9 (-5.1) times longer than wide; base attenuate to cuneate to rounded, or cordate and minutely auriculate; margin entire or sometimes serrulate or indistinctly denticulate; apex acuminate to long acuminate; longitudinal nerves 3, or rarely 5, prominent beneath; upper surface often with an indumentum of minute uniseriate, very rarely branched, glandular hairs, sometimes also with peltate glands or stellate to plumose hairs, or with only peltate glands or only stellate to plumose hairs, or very rarely with only a few short soft hairs, or very rarely with whitish, somewhat curly long hairs, or glossy from a varnish-like secrete, when young, with reminiscences of these or glabrous when old; lower surface with peltate glands, or, in addition, with minute uniseriate very rarely branched glandular hairs, or stellate to plumose hairs when young, with peltate glands, and reminiscences of other young indumentum when old.

Inflorescences few-flowered axillary fascicles with 0.5-2 (-7, or in one case 19) mm long peduncles, or few to many-flowered axillary or terminal thyrses, 5-13 cm long including (0.5-) 1-6.6 cm long peduncles, inflorescence branches with an indumentum as branchlets. Bracts absent or minute. Pedicels 0.5-5 (-10) mm long, longest in fruit. Flowers actinomorphic, 4-merous, bisexual. Hypanthium campanulate to urceolate, usually subquadrangular in cross section, usually thin-walled, 1.1-6 mm long, 0.8-2.4 mm wide, longer than wide, lepidote or usually with a thin cover of peltate, very rarely stipitate, glands, often also with minute uniseriate glandular hairs or with a thin to dense stellate to plumose indumentum, or very rarely glabrous and covered with a glossy or dull varnish-like layer. Sepals connate into a low rim, usually 0.1-0.2 mm high at sinuses, lobes broadly to very broadly triangular to acuminate, very rarely rounded, thickened and pointed dorsally, or rarely ligulate, 0.7-1.7(-2.7) mm long, with an indumentum as hypanthium, persistent



Pl. 1. — *Blastus*, parts of flowers and fruits, all  $\times 7.5$  : 1, *B. borneensis* Cogn. var. *borneensis*, flower and bud (Eberhardt 2796, P) ; 2, *B. cochinchinensis* Lour., longitudinal section of mature fruit, seeds removed (Tsang 26555, P) ; 3, *B. cochinchinensis*, transverse section of hypanthium in flower (Tsang 29868, C) ; 4, *B. cavaleriei* A. Lévillé, old fully dehiscent fruits (Handel-Mazzetti 10913, W) ; 5, *B. multiflorus* (Cogn.) Guillaumin, mature fruit, old dehiscent fruit from above and same in lateral view with two valves removed (Pocs, Khoi & Tiep 1021, P) ; 6, *B. cavaleriei*, mature fruit (Handel-Mazzetti 10913, W) ; 7, *B. borneensis* var. *eberhardtii* (Guillaumin) C. Hansen, mature dehiscent fruit, entire and with one valve removed (Poilane 1577, P).



Pl. 2. — **Blastus**, stamens, all  $\times 7.5$  : 1, **B. cochinchinensis** Lour. (*Furuse s.n.*, 13.8.1961, S) ; 2, **B. borneensis** Cogn. var. **stellulatus** (Geddes) C. Hansen (*Kerr 15447*, K) ; 3, **B. borneensis** var. **borneensis** (Sinclair & al. 9225, K) ; 4, **B. borneensis** var. **eberhardtii** (Guillaumin) C. Hansen (*Chevalier 38760*, P) ; 5, **B. borneensis** var. **pulverulentus** (Ridley) C. Hansen (*Kloss s.n.*, Feb. 1912, K) ; 6, **B. multiflorus** (Cogn.) Guillaumin (*Bon 3156*, P) ; 7, **B. pauciflorus** (Benth.) Guillaumin (*Sampson & Hance 11352*, K) ; 8, **B. thaiyongii** C. Hansen (*Dalziel s.n.*, 15.9.1898, E) ; 9, **B. cavaleriei** A. Lévillé (*Bodinier 2170*, P).

in fruit. Petals ovate to elliptic, sometimes irregularly so, thin to thick, 1-5.1 mm long, 0.7-3.6 mm wide, glabrous or with a few peltate glands on the outside, at least in bud, rarely papillate, or very rarely with stellate hairs on the inside, whitish, often tinged with pink, or pinkish to purplish. Stamens 4, isomorphic and equal in size, episeplar; filaments more or less flat, sometimes thick, 0.8-7.4 mm long, glabrous or with peltate, rarely stipitate, glands dorsally on distal part, or with minute uniseriate glandular hairs; anthers short, slightly S-shaped or curved in lateral view, broad at base, tapering into a beak towards apex, or longer, curved in lateral view, linear, tapering into a beak, (0.9-) 1.4-7.4 mm long, base cordate, bituberculate or sagittate; anther sacs very rarely bullate; connective distinct to indistinct, also present dorsally on free basal part of anther sacs, dorsally inappendiculate or rarely exceeding anther sacs in a bituberculate or sagittate way, glabrous or with a few peltate, rarely stipitate, glands; pore 1, about as wide as apex of anther. Ovary usually about two thirds the length of the hypanthium, partially adnate to it for two thirds to the whole of its length, apically usually slightly to deeply depressed around base of style and with an indumentum of peltate glands or rarely small gland-tipped hairs; anther pockets extending to base or, rarely, below base of ovary; placentas not protruding into ovary cells, but forming together a somewhat fleshy column square in cross section. Style 2.7-14.3 mm, glabrous, or rarely with some peltate glands, stellate hairs or small gland-tipped hairs on basal half, deciduous after flowering; stigma small, usually slightly narrower than style.

Fruit a loculicidal light brown capsule about as long as and included in the long persistent hypanthium and often breaking it when dehiscing, elliptic, urceolate to fusiform, rarely with 4 low ribs, base rounded to acute to attenuate, (1.1-) 1.5-5 (-6) mm long, 1.2-3.7 mm wide; the disengaged placental column usually beaked. Seeds straight, cuneate, obovate, elliptic or oblong, or narrowly so, sometimes slightly angular, rarely with extensions at both ends, usually with a beak at chalaza, 0.3-1.8 mm long. Testa bullate or in places tuberculate, light brown to brown. Raphe a narrow and shallow furrow, or rarely broad, or rarely a rounded angle or low ridge. Strophiole restricted to hilum area or sometimes continuing as a thin strand along raphe, rarely a thick strand along the whole length of the seed exceeding testa at both ends, brownish usually in shades different from testa.

#### KEY TO THE SPECIES

- |      |   |                              |
|------|---|------------------------------|
| 1 a. | Leaves sessile, pandurate.....                                      | 11. <i>B. auriculatus</i>    |
| b.   | Leaves petiolate, ovate to elliptic.....                            | 2                            |
| 2 a. | Inflorescence axillary.....   | 3                            |
| b.   | Inflorescence terminal.....   | 7                            |
| 3 a. | Inflorescence a sessile or shortly pedunculate fascicle.....        | 4                            |
| b.   | Inflorescence a thyrse.....   | 6                            |
| 4 a. | Hypanthium lepidote from a dense cover of peltate glands.....       | 1. <i>B. cochinchinensis</i> |
| b.   | Hypanthium with a thin cover of peltate glands.....                 | 5                            |
| 5 a. | Hypanthium with long patent hairs in addition to peltate glands.... | 2. <i>B. mollissimus</i>     |
| b.   | Hypanthium with only peltate glands.....                            | 3. <i>B. tsaii</i>           |

- 6 a. Under surface of leaves without peltate glands..... 5. *B. eglandulosus*  
 b. Under surface of leaves with peltate glands..... 4. *B. borneensis*
- 7 a. Under surface of leaves without glands..... 5. *B. eglandulosus*  
 b. Under surface of leaves distinctly with peltate glands..... 8
- 8 a. Leaves minutely auriculate..... 9  
 b. Leaves not auriculate..... 11
- 9 a. Hypanthium at most 2 mm long; transition of filament and connective densely clothed with peltate and stipitate glands..... 6. *B. multiflorus*  
 b. Hypanthium more than 2.5 mm long; transition of filament and connective without glands..... 10
- 10 a. Anthers at most biauriculate ventrally, 4-4.5 mm long; hypanthium in flower 2.7-3.5 mm long..... 8. *B. thaiyongii*  
 b. Anthers sagittate ventrally, 6.2-7.4 mm long; hypanthium in flower 3.8-6 mm long.... 7. *B. pauciflorus*
- 11 a. Sepals ligulate.....12  
 b. Sepals not ligulate..... 13
- 12 a. Anthers narrowly cordate at base; under surface of leaves with peltate glands mainly on veins of tertiary order..... 9. *B. cavaleriei*  
 b. Anthers sagittate at base; under surface of leaves with peltate glands evenly scattered ..... 7. *B. pauciflorus*
- 13 a. Anthers sagittate ventrally, 6.2-7.4 mm long; hypanthium in flower 3.8-6 mm long.. 7. *B. pauciflorus*  
 b. Anthers cordate or at most bituberculate ventrally, (0.9-)1.4-2.8(-3.5) mm long; hypanthium in flower 1.1-2.7 (-3.5) mm long..... 4. *B. borneensis*

NOTE TO LEAD 13 : *B. squamosus* will also end up here. Because it is known only in young bud or mature fruit I have not been able to enter it in the key. The hypanthium in young bud is 3.5-4 mm long. The young anthers seem to be bituberculate ventrally. The seeds are long and narrow and filled with air distally. See also notes under the species.

1. ***Blastus cochinchinensis*** Lour.

Fl. Cochinch. 1 : 527 (1790).

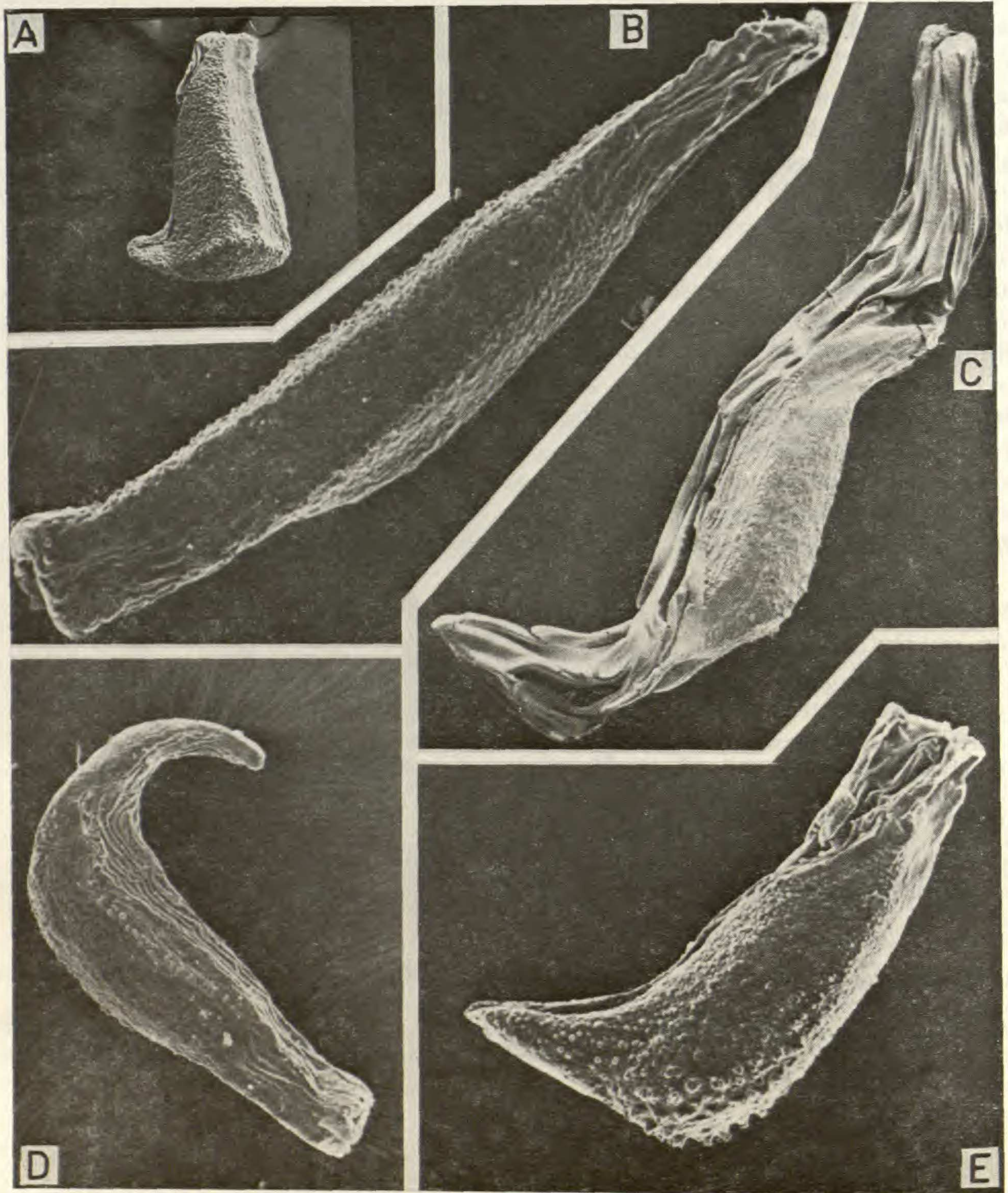
— *Anplectrum parviflorum* BENTH., Fl. Hongk. : 116 (1861); type : *Wright 478*, Hongkong (GH, K, NY, P, US).

— *Blastus parviflorus* (BENTH.) TRIANA, Trans. Linn. Soc. London 28 : 74, *tab. 6, fig. 65* (1872).

— *B. marchandii* A. LÉVEILLÉ, Feddes Repert. Spec. Nov. Regni Veg. 11 : 494 (1913); type : *Esquirol 967*, Tchang-loy, June 1906 (A, E, G).

TYPE : *Loureiro s.n.* (not seen).

0.9-3 m high. Branchlets subquadrangular and densely brownish lepidote when young, terete and glabrous when older. Petiole of small leaves 0.7-1.8 (-2.2) cm long; petiole of large leaves (1.1-) 1.8-2.6 (-3.7) cm long. Leaf-blade ovate to elliptic; blade of small leaves (4.6-) 6.2-11.5 (-14.2) cm long, (1.6-) 2-3.9 cm wide, 2.5-3.6 (-4.4) times as long as wide, blade of large leaves (8-) 11.2-15 (-18.7) cm long, (2.7-) 3.1-5.1 (-6.4) cm wide, 2.4-3.8 (-4.6) times as long as wide.



Pl. 3. — Seeds of some species of *Blastus* : **A**, *Blastus borneensis* Cogn. var. *borneensis* (Clemens 20928, K) ; **B**, *B. squamosus* C. Y. Wu & Y. C. Huang (Ching 6945, US) ; **C**, *B. cochinchinensis* Lour. (Tsang 27217, K) ; **D**, *B. multiflorus* Guillaumin (Balansa 3509, P) ; **E**, *B. pauciflorus* (Benth.) Guillaumin (Tsang & Chow 14311, A).



Inflorescence an axillary, shortly pedunculate fascicle of up to 10 flowers. Peduncles 1-2 in an axil, 0.5-2 (-19) mm long. Pedicels 1.2-5 (-10) mm. Hypanthium urceolate to campanulate, thick-walled, 2.5-3.6 mm long, 1.4-2.4 mm wide, 1.2-2 times as long as wide, lepidote from a dense cover of peltate glands. Sepals connate into a low rim, 0.2-0.7 mm high at sinuses, lobes very broadly triangular to acuminate, thick dorsally and bluntly pointed close to apex, 0.5-1 mm long. Petals irregular, though ovate in general shape, thick along middle, 3-3.8 mm long, 1.6-3.6 mm wide, whitish often tinged with pink, red or purple. Filaments 1.5-3.2 mm long, glabrous; anthers weakly S-shaped, 2-4 mm long, base cordate; connective broad, but indistinct, inappendiculate, glabrous. Ovary partially adnate to hypanthium for almost its whole length, apically more or less depressed around base of style and covered with peltate glands. Style 4.8-7.8 mm long, glabrous. Fruit elliptic, base attenuate, 3-4.5 mm long, 2.4-3.7 mm wide, breaking the hypanthium when dehiscing, placental column long-beaked. Seeds narrowly cuneate, obovate or elliptic with bent or straight extensions at both ends, 1.1-1.8 mm long. Testa bullate or at some places tuberculate, light brown. Raphe a wide furrow along the whole length of the seed, extensions included. Strophiole a thick strand filling the raphe along the whole length of the seed and exceeding it considerably at both ends, paler brown or darker brown than testa. — Pl. 1, 2, 3, 5.

DISTRIBUTION (Fig. 4) : India (Assam), China (Kwangtung, Fukien, Hainan), Taiwan, Japan (Ryu Kyu Islands), N. and S. Vietnam.

ECOLOGY : *B. cochinchinensis* grows in various kinds of forests and thickets. Soils mentioned on the labels are silt, clay and sand. It has been gathered at altitudes between 90 and 1000 m except for two collections : *Faurie 434*, 2500 m, and *Poilane 23534*, 1500-1800 m. Flowering specimens have been collected in all months except February and March, but there is a peak of flowering from April to August.

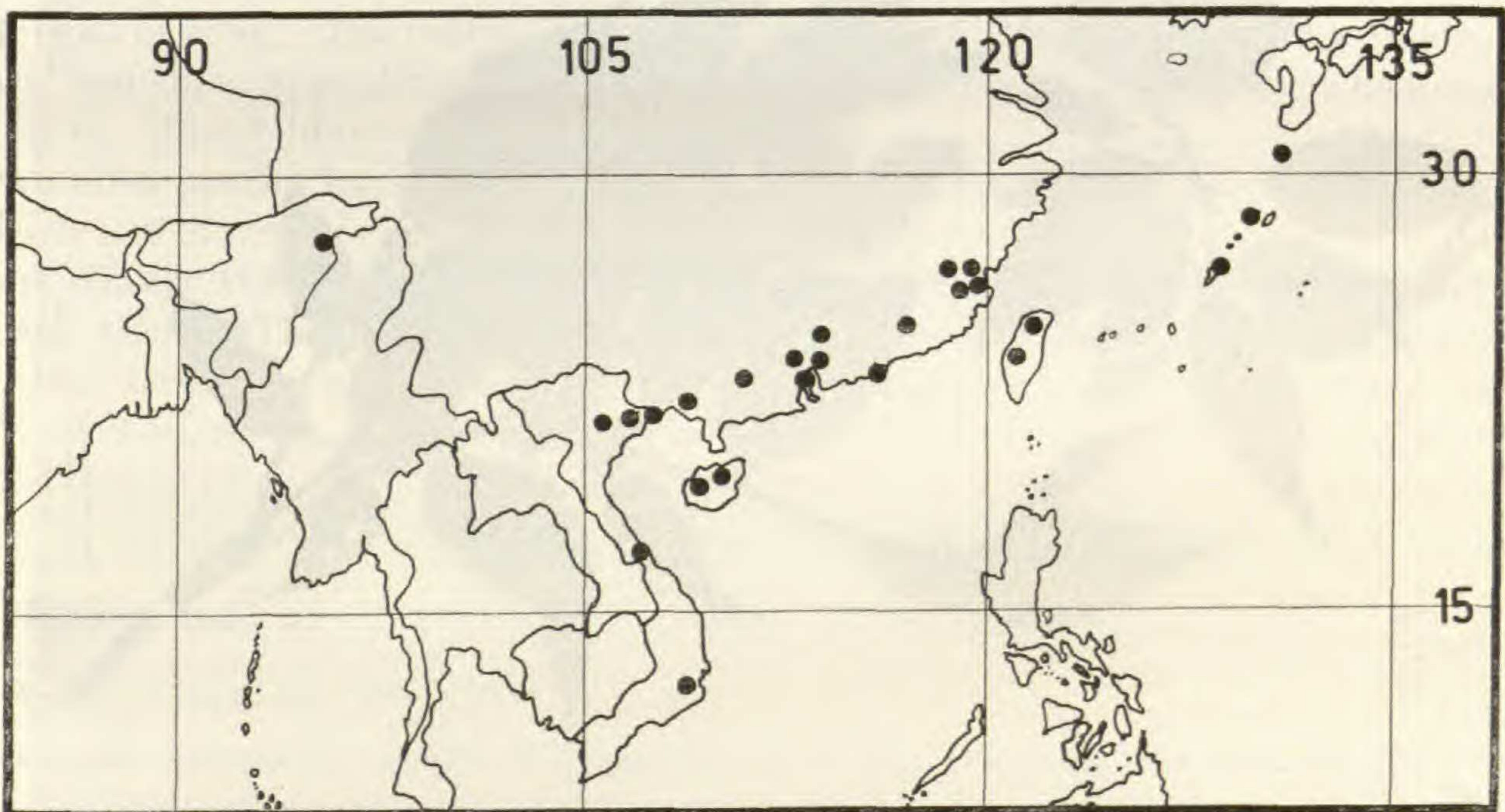
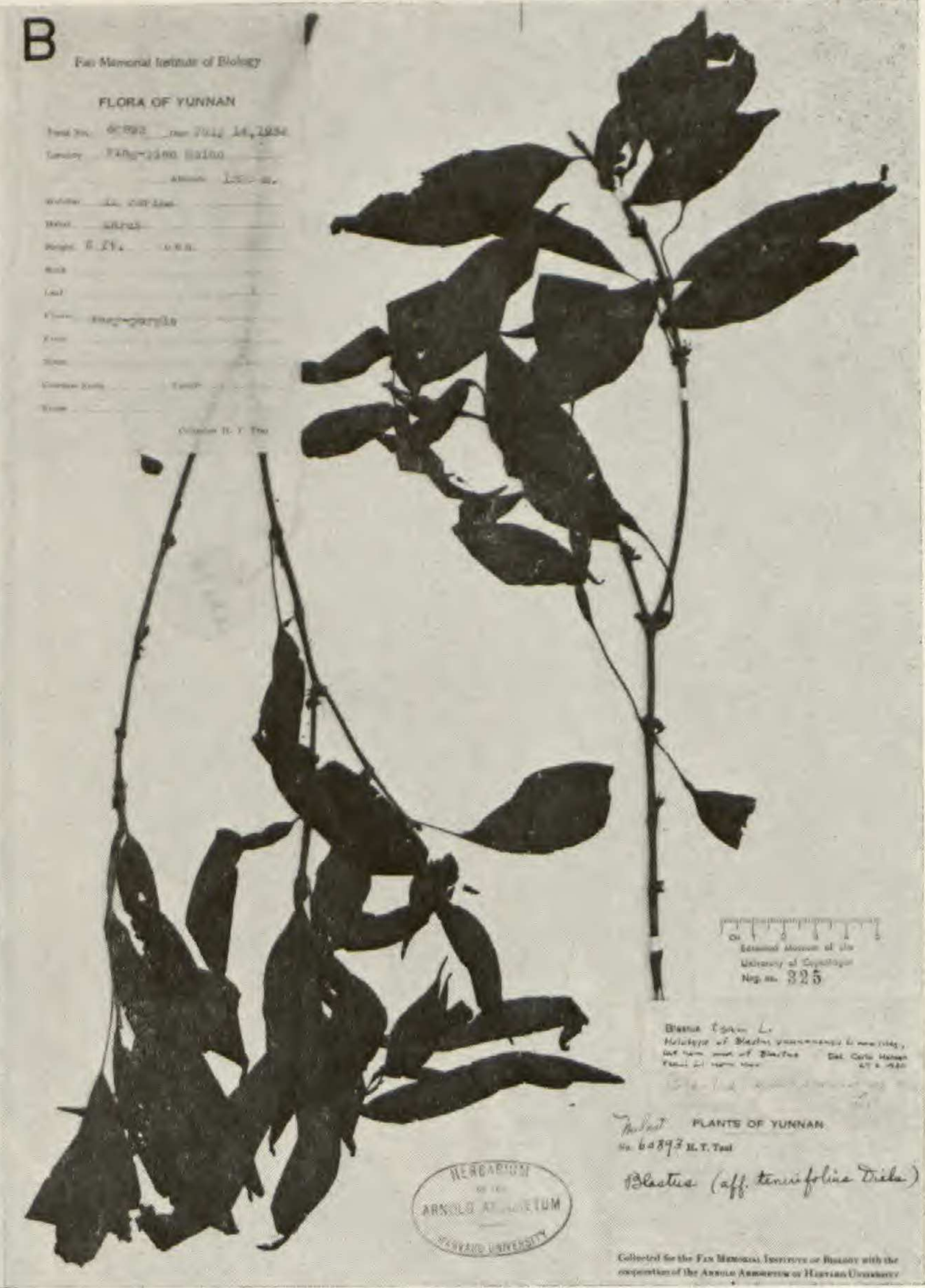


FIG. 4. — Total distribution of *Blastus cochinchinensis* Lour.



Pl. 5. — A, *Blastus cochinchinensis* Lour. ; B, *B. tsaii* Li.

NOTES : The peduncles are stout and often two in number in a serial way in a leaf axil. The much produced peduncle of 19 mm observed in *Balansa 4054* is rather an axis with fascicles of flowers at two nodes and at the apex.

The petals principally are ovate, but often very irregular in outline due to a lobe on one side clasping in bud over the next petal of the whorl.

The adnation of the ovary and the hypanthium is interrupted by the four anther pockets (Pl. 1, 3). The area of concrescence between two pockets is wide and cannot be described as a septum. Only at the top it is narrow and run as a sharp ridge some way up on the inside of the free part of the hypanthium above the ovary.

The disengaged column in the fruit is long-beaked and has four wings on the lower part from remnants of the septa (Pl. 1, 2).

## 2. *Blastus mollissimus* Li

J. Arnold Arbor. 25 : 16 (1944).

TYPE : *Wang 40050*, Kwangsi, Yao Shan (holo-, A).

DISTRIBUTION (Fig. 13, B) : China (Kwangsi).

ECOLOGY : The type, which is a fruiting specimen, has been collected at a stream side in October. There are no notes on soil or altitude.

NOTES : Only the type (Pl. 6, A), which is a specimen in fruit, has been available. Nothing important can be added to LI's description, so I refer to that.

The specimen has the peltate glands of *Blastus*, so it belongs there. Because of its axillary sessile inflorescences it is probably related to *B. cochinchinensis* from which it differs by its indumentum of long, somewhat curly, patent, whitish hairs composed of several rows of cells. The indumentum occurs on young branchlets, petioles, leaves, inflorescence branches, hypanthium and sepals. It differs also by its sepals, which are long and narrow, almost filiform.

Two other species have been described from Yao Shan in Kwangsi. They are *B. setulosus* Diels and *B. tenuifolius* Diels, which both are known only from their type specimens. It seems strange that three rare species of *Blastus* are known from the same locality and only from there. The types of *B. setulosus* and *B. tenuifolius* have not been available to me, but according to the description both are hairy. Perhaps they belong together with *B. mollissimus* in one taxon. In this paper they are ranged as doubtful species (p. 73).

## 3. *Blastus tsaii* Li

J. Arnold Arbor. 25 : 309 (1944), *nom. nov.*

— *Blastus yunnanensis* LI, J. Arnold Arbor. 25 : 15 (1944), *nom. illeg., lat. hom.*

TYPE : *Tsai 60813* (by mistake *60893* in protologue), Yunnan, Ping-pien Hsien (holo-, A ; iso-, P, S).

**A** FLORA OF KWANGSI  
 Botanical Institute, Sun Yatzen University  
 Herb. No. 40050 Collector C. Wang  
 Date Oct. 12, 1930.  
 Locality Yao Shan  
 Altitude \_\_\_\_\_  
 Habitat stream side  
 Substratum Small karst  
 Height \_\_\_\_\_ Diameter \_\_\_\_\_  
 Bark \_\_\_\_\_  
 Wood \_\_\_\_\_  
 Leaf \_\_\_\_\_  
 Flower \_\_\_\_\_  
 Fruit Green lomentous  
 Special Notes \_\_\_\_\_  
 Name \_\_\_\_\_

Scale bar  
 Division of the  
 University of Cambridge  
 No. 240

**B**



PLANTS OF KWANGSI  
 Herbarium of the Arnold Arboretum, Harvard University  
 No. 40050 C. Wang  
*Blastus*

HERBARIUM  
 OF THE  
 ARNOLD ARBORETUM  
 HARVARD UNIVERSITY

HERBARIUM  
 No. 1905

Scale bar  
 Division of the  
 University of Cambridge  
 No. 208

B. BILIRI PIANTE BORNESE.  
 1905 *Blastus borneensis* Cogn.  
 BAGIATO DI SABAWAR

Anacardiaceae sp.  
 HOLOTYPE of *Blastus mollissimus* Li  
 Det. C. Wang  
 2.1.1937

Collected by Sun Yatzen University

*Blastus borneensis* Cogn.  
 Type material of *Blastus borneensis* Cogn.

Pl. 6. — A, *Blastus mollissimus* Li ; B, *B. borneensis* Cogn. var. *borneensis*.

1.6 m high. Branchlets subquadrangular with four low ribs and an indumentum of yellow peltate glands and some minute brownish glands when young, terete and glabrous when older. Petioles 1.5-5.5 cm long. Leaf-blade ovate, 8-14 cm long, 2.5-4.5 cm wide; base attenuate; margin entire; apex long acuminate; 3-nerved; upper surface with a few short hairs, under surface with peltate glands.

Inflorescence an axillary fascicle of a few flowers. Peduncle at most 1 mm long. Pedicels about 2 mm long. Hypanthium campanulate, ca. 3 mm long and 1.5 mm wide, with a thin cover of peltate glands and some minute brownish glands. Sepals connate into a low rim, 0.1 mm high at sinuses, lobes broadly triangular, about 0.2 mm long. Petals ovate, ca. 2.5 mm long, rosy purple. Filaments about 2 mm long, glabrous; anthers weakly S-shaped, about 3.5 mm long, base cordate; connective distinct, inappendiculate, glabrous. Observations on ovary: top depressed around base of style and covered with peltate glands. Style about 5.5 mm long, glabrous. Fruit not known.

DISTRIBUTION (Fig. 13, A): China (Yunnan).

ECOLOGY: The type, which is a specimen in bud, flower and young fruit and the only one known, has been collected on 7 July in a ravine at 1300 m altitude.

NOTES: The description is an emendation of the protologue. It is less detailed than the description of the other species, because of the scarce material. For instance no flower has been boiled and studied in detail.

Habitually the species comes close to *B. cochinchinensis*. It differs from it by its smoother and non-lepidote young branchlets, petioles and hypanthia on which the peltate glands occur thinly, and by its seeds in which the strophiole does not exceed the testa apically. The seeds could be studied only in a young fruit, but were compared with the seeds of an equally young fruit of *B. cochinchinensis*, and the difference mentioned above was distinct.

Additionally *B. tsaii* differs from *B. cochinchinensis* by its dark green hypanthium (light brown in *B. cochinchinensis*); by the soft hairs on upper leaf surface (absent in *B. cochinchinensis*); and by the prominent nerves of secondary order on lower leaf surface (not elevated in *B. cochinchinensis*).

#### 4. *Blastus borneensis* Cogn.

In A. & C. DC., Monogr. Phan. 7: 477 (1891).

Branched shrub, 1.3-4.5 (-7) m high. Branchlets slightly flat with a thin to dense vestiture of peltate glands and often also minute brownish glands, the latter very densely at times, or sometimes the glandular vestiture totally covered by a vestiture of plumose hairs when young; branchlets terete and glabrous when older. Petiole of small leaves 0.3-1.5 (-2.4) cm long; petiole of large leaves (0.5-) 0.8-2.7 (-3.5) cm long. Leaf-blade ovate to elliptic; blade of small leaves (2.8-) 3.3-13.5 (-21.4) cm long, (0.7-) 1-4.2 (-7.8) cm wide, (1.5-) 2.5-4.1 (-5) times as long as wide, blade of large leaves (4.6-) 8-18.7 (-28) cm long, (1.6-) 2.7-5.8 (-9.8) cm wide, (1.8-) 2.9-3.9 (-5.1) times as long as wide; base attenuate to acute to rounded; margin entire or rarely weakly dentate; apex long acuminate; 3 (-5)-

nerved ; upper surface when very young with a thin to dense vestiture of stellate to plumose hairs, and often also of minute brownish glands, when older glabrous or with a reminiscence of the young vestiture, at least along nerves ; under surface always with peltate glands both on lamina and nerves, sometimes also with minute brown glands, and when young sometimes with stellate or plumose hairs in addition.

Inflorescence an axillary or terminal thyrses rarely more than 5 cm long. Pedicels 0.5-2.5 (-4.4) mm long. Hypanthium campanulate to urceolate, thin-walled, 1.1-1.8 (-3.5) mm long, 0.8-1.5 (-2.3) mm wide, 1-1.9 (-2.4) times as long as broad, always with yellow, rarely red, peltate glands, sometimes with minute glands and sometimes with a thin to dense stellate indumentum in addition. Sepals very shortly connate into a low rim, 0.2-0.5 (-1.2) mm high at lobes and about 0.1 mm high at sinuses, lobes very broadly triangular to acuminate, with a dorsal conical thickening bluntly pointed close to apex, 0.2-0.5 (1.2) mm long. Petals irregularly ovate, 1-2.5 mm long, 0.7-1.3 mm wide, very rarely with stellate hairs on the inside, white to yellowish or rarely pinkish. Filaments thick, (0.8-) 1-1.8 (-2.3) mm, glabrous or with peltate glands usually distally, or very rarely with minute glands and simple to stellate hairs ; anthers slightly S-shaped ; (0.9-) 1.4-2.8 (-3.5) mm long ; base cordate or rarely bituberculate ; connective indistinct, inappendiculate or very rarely bituberculate ventrally, with peltate glands on basal half. Ovary partially adnate to hypanthium for about its whole length, apically deeply depressed around base of style, edge of depression densely covered with peltate glands. Style 2.7-7.1 (-11) mm long, glabrous or with a few peltate glands on basal half, very rarely with stellate hairs.

Fruit urceolate or more often cup-shaped, base broadly rounded, sometimes weakly ribbed, (1.1-) 1.5-2.3 (-2.9) mm long, 1.2-2.6 mm wide, not breaking the hypanthium when dehiscing, placental column not beaked. Seeds cuneate and sometimes slightly angular with a short beak at chalaza, 0.3-0.4 mm long. Testa bullate or sometimes tuberculate in places, light brown. Raphe a shallow furrow or a rounded angle or a low ridge. Strophiole restricted to hilum area or continuing as a thin strand along raphe, brown.

DISTRIBUTION AND ECOLOGY : See under varieties.

NOTES : Within the area of *B. borneensis* several species have been described which turned out to be difficult to distinguish from it by concise characters. They are all, like *B. borneensis*, small-flowered with the flowers arranged in small axillary or terminal thyrses. Further they are alike by having the same kind of stellate to plumose indumentum when an indumentum occurs in addition to peltate glands, and by the general appearance of the stamens. Also they differ from most other species by their smaller floral parts. From *B. cochinchinensis* they differ also by having thyrses instead of fascicles.

The species closely related to *B. borneensis* are *B. eglandulosus*, *B. eberhardtii*, *B. stellulatus*, *B. pulverulentus*, *B. tomentosus* Bakh. f., *B. sumatranus* and *B. caudatus*. Among these I have retained only *B. eglandulosus* as a species of its own. It is easily recognized by its lack of peltate glands and by its layer of secrete on the hypanthium.

The remaining species I have included in *B. borneensis* in four varieties. Except for some specimens of *B. eberhardtii* they have only terminal inflorescences. Except from *B. stellulatus* they differ from *B. borneensis* var. *borneensis* by their stouter appearance

and by their larger subcoriaceous leaves. Except for *B. eberhardtii* they have larger floral parts. In all specifications of size there are overlappings to *B. borneensis* var. *borneensis*.

The vestiture commonly may consist of three elements, very rarely a fourth may be found. Peltate glands always occur on young branchlets, petioles and under surfaces of leaves. Minute uniseriate brownish glands are often or perhaps always present. When they are few they are easily overlooked. They occur as the peltate glands and rarely also on the upper surface of the leaves. In some specimens from Mt. Kinabalu (*Clemens 27064*, etc.) they occur very densely on the branchlets. Stellate or more often plumose hairs always occur very densely on the upper surface of very young leaves. This indumentum soon falls off except for remains mostly along the nerves. In a number of specimens the stellate-plumose indumentum is strongly developed also on branchlets and petioles. In such specimens both the minute and peltate glands are hidden by it. The minute glands and the stellate-plumose hairs seem to be related. On the upper surface of the leaves, when the latter is poorly developed, intermediates between them can be seen. One or two of the cells of a uniseriate hair may have developed lateral excrescences, but the terminal brown secretory cell persists. Other hairs have become longer having excrescences from all cells, which may have become somewhat inflated, and the terminal brown cell is absent. The indumentum termed stellate to plumose is composed of such uniseriate candelabra hairs (UPHOF, 1962, p. 21). The rare fourth element is soft multicellular hairs on the upper surface of the leaves, seen for instance in *Ridley 2947*.

The common vestiture mentioned above may be found on various floral parts. Peltate glands are always present on hypanthium, sepals, top of ovary, dorsal side of anthers (Pl. 2, 2-6) and may occur thinly on the outside of the petals, filaments and basal half of style. In *Hallier 3158* from Borneo the hypanthium is covered by a secrete, in which the tightly appressed peltate glands are embedded. The minute glands may occur on the hypanthium. A usually thin indumentum of stellate hairs is often seen on the hypanthium of specimens from Sumatra, Borneo and Celebes, less often on specimens from elsewhere. In *Elbert 3205* and *Kjellberg 1814* reduced stellate hairs and in *Sinclair & al. 9225* minute glands have been observed on the inside of the petals.

In all specimens with stamens from Sumatra the anthers are bullate (Pl. 2, 3). Among the eight specimens with flowers from Borneo two have bullate anthers (*Clemens 30285* and *Sinclair & al. 9225*). There is no apparent correlation between bullate anthers and other characters.

When dehiscing, the valves of the capsule do not bend so strongly backwards that the hypanthium is broken. Therefore the stages of very old fruit where the disengaged placental column is seen in the middle between the somewhat spreading valves, as in *B. cochinchinensis* and *B. multiflorus*, do not occur. In dissected old fruits it can be seen that the placental column seems to have shrunk when drying, indicating that it may have been fleshy.

#### KEY TO VARIETIES

- |      |   |   |
|------|---|---|
| 1 a. | Hypanthium 1.1-2.3 mm long; anthers (0.9-) 1.4-2.9 mm long..... | 2 |
| b.   | Hypanthium 2.3-3.5 mm long; anthers 3-3.5 mm long.....          | 3 |

- 2 a. Leaves thin, 2.4-4.1 (-5.1) times longer than wide..... 4a. var. *borneensis*  
b. Leaves subcoriaceous, 1.5-2.6 (-3.5) times longer than wide..... 4b. var. *eberhardtii*  
3 a. Hypanthium 2.3-2.7 mm long, filaments glabrous or sometimes with peltate glands, style glabrous; leaves thin, 2.3-3.6 (-4.4) times longer than wide..... 4c. var. *stellulatus*  
b. Hypanthium 3-3.5 mm long, filaments and style with simple to slightly stellate hairs; leaves subcoriaceous, 1.7-2.3 (-3.9) times longer than wide..... 4d. var. *pulverulentus*

4a. var. **borneensis**

- *Ochthocharis parviflora* COGN., in A. & C. DC., Monogr. Phan. 7 : 481 (1891).  
— *Blastus cogniauxii* STAPF, in HOOKER'S Icon. Pl. 24 : tab. 2311 (1894); type *Beccari 1403*, Sarawak, Borneo, BR, K, P.  
— *B. caudatus* SPARE, Bull. Misc. Inform. : 319 (1929); type : *King's collector 553*, Perak, Gopong, G, K, P, W.  
— *B. cogniauxii* STAPF var. *caudatus* (SPARE) NAYAR, Cuff. Sci. 37 : 413 (1968).  
— *B. sumatranus* MERR., Pap. Michigan Acad. Sci. 24 : 84 (1939); type : *Rahmat Si Toroos 4803*, Sumatra, Tapianoeli, Padang Si Dimpoean, Padang Lawas, Aek Kanan (topographic sheet 41, northwest quarter), A, L, NY, US.  
— *B. borneensis* BOERL., Handl. Fl. Ned. Indie 1 (2) : 512, 531 (1890), *nom. nud.*  
— *Ochthocharis parviflora* BOERL., *l.c.* : 531 (1890), *nom. nud.*

TYPE : *Teysmann 8662*, in Borneo ad Kapuras (holo-, BR).

DISTRIBUTION (Fig. 8, A) : Hainan, N. and S. Vietnam, Laos, Thailand, Malay Peninsula, Sumatra, Borneo, Celebes.

ECOLOGY : *B. borneensis* var. *borneensis* has been collected mainly in primary and secondary rain forests, in several cases specified as dipterocarp forests. According to label notes it grows on clay, sandy clay, basalt and granite. It occurs at altitudes from 30-2100 m. It flowers all the year round.

ILLUSTRATIONS : Stamen (Pl. 2, 3); flower (Pl. 1, 1); seed (Pl. 3, A); herbarium specimen (Pl. 6, B); distribution (Fig. 8, A).

4b. var. **eberhardtii** (Guillaumin) C. Hansen, *comb. & stat. nov.*

- *Blastus eberhardtii* GUILLAUMIN, Bull. Soc. Bot. France 68 : 3 (1921).

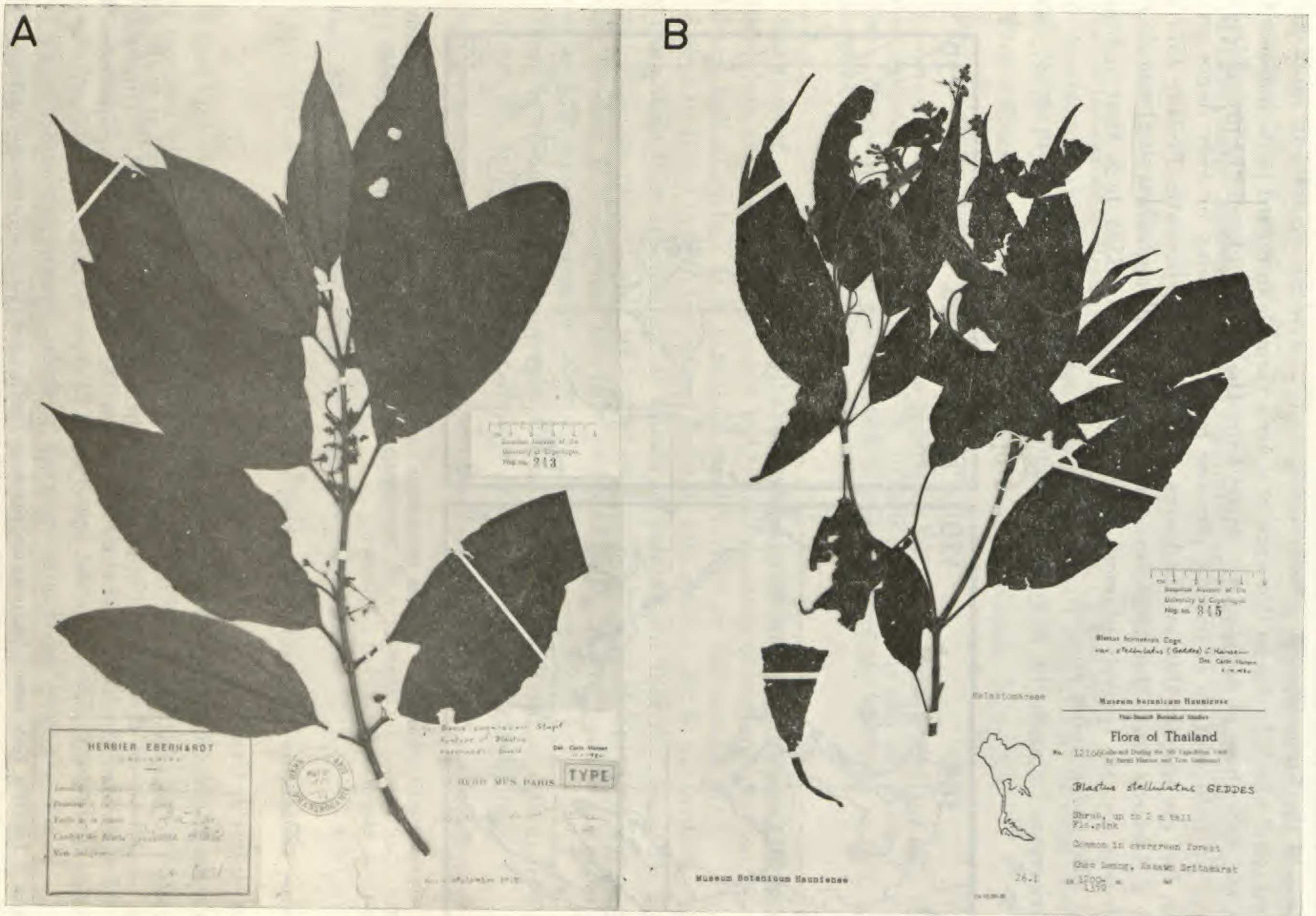
TYPES : *Eberhardt 4955 & 5031*, Tonkin, prov. de Vinh Yen, P.

DISTRIBUTION : N. and S. Vietnam.

ECOLOGY : var. *eberhardtii* grows in humid places among rocks in forests, on poor or fertile soil. It has been gathered at altitudes between 800 and 1300 m. Flowering specimens have been gathered from February to July.

NOTES : *B. borneensis* var. *eberhardtii* is not very distinct. It mainly differs from *B. borneensis* var. *borneensis* by its larger and broader leaves, but both in regard to their size and length-width ratio there are overlappings to var. *borneensis*. The fruits apparently are longer in var. *eberhardtii* than in var. *borneensis*. Habitually the specimens are stout and the leaves are subcoriaceous, though in *Poilane 1577* and *3335* they are thin. The anther sacs seem to be somewhat reduced, so that the ventral fissure is shallow and





Pl. 7. — **A**, *Blastus borneensis* Cogn. var. *eberhardtii* (Guillaumin) C. Hansen; **B**, *B. borneensis* var. *stellulatus* (Geddes) C. Hansen.

sometimes indistinct (Pl. 2, 4). The connective is always shortly connate ventrally of the insertion of the filament.

The material which I refer to this variety is very variable in regard to its indumentum adding to the difficulties of defining it. Apart from the peltate glands the branchlets and leaves have an indumentum of usually plumose hairs, which may be very dense on the branchlets, but are usually thin on the leaves or present only beneath. *Poilane 1577* and *3335* and *d'Alleizette s.n.*, Mai 1909, are alike in general appearance. *Poilane 1577* and *d'Alleizette s.n.* are sparsely plumose hairy while *Poilane 3335* lack that indumentum. See also notes under species.

ILLUSTRATIONS : Stamen (Pl. 2, 4) ; fruit (Pl. 1, 7) ; herbarium specimen (Pl. 7, A) ; distribution (Fig. 8, B).

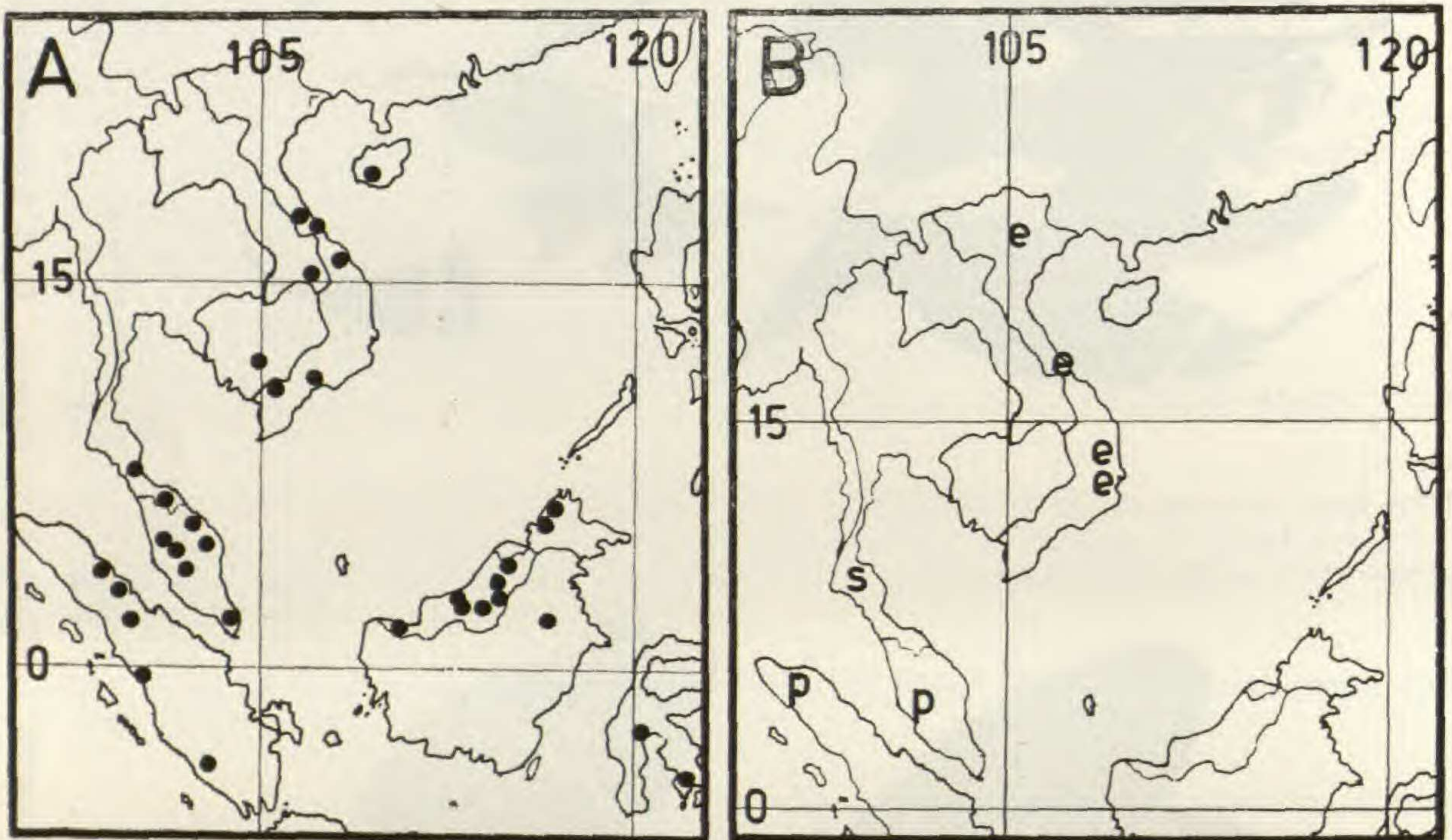


FIG. 8. — Total distributions. A : *Blastus borneensis* Cogn. var. *borneensis* ; B : e, *B. borneensis* var. *eberhardtii* (Guillaumin) C. Hansen ; p, *B. borneensis* var. *pulverulentus* (Ridley) C. Hansen ; s, *B. borneensis* var. *stellulatus* (Geddes) C. Hansen.

4c. var. **stellulatus** (Geddes) C. Hansen, *comb. & stat. nov.*

— *Blastus stellulatus* GEDDES, Bull. Misc. Inform. : 236 (1928).

TYPE : *Smith 721*, Siam, Khao Luang, ABD, K.

ECOLOGY : *B. borneensis* var. *stellulatus* grows in forest in open places as well as in the shade. There are no records on the soil. One specimen is labelled 200-700 m altitude. Otherwise the available specimens have been gathered at altitudes from 700-1500 m. Flowering specimens have been collected in January, April, May and August.

NOTES : Unlike the two other varieties var. *stellulatus* is a narrow-leaved and thin-leaved variety that in regard to the size and length-width ratio of the leaves falls com-

pletely within the variation of var. *borneensis*. It differs from var. *borneensis* by its larger hypanthium and longer anthers. The inflorescence is always terminal. See also notes under species.

ILLUSTRATIONS : Stamen (Pl. 2, 2) ; herbarium specimen (Pl. 7, B) ; distribution (Fig. 8, B).

4d. var. **pulverulentus** (Ridley) C. Hansen, *comb. & stat. nov.*

— *Blastus pulverulentus* RIDLEY, J. Linn. Soc., Bot. 41 : 290 (1913).

— *B. tomentosus* BAKH. f., Meded. Bot. Mus. Herb. Rijks Univ. Utrecht 91 : 276 (1943) ; type : *van Steenis 6283*, Sumatra, Atjeh, Boernilintang (holo-, L ; iso-, K).

TYPE : *Kloss s.n.*, Menuang Gasing, Ulu Langat, Selangor (holo-, K).

DISTRIBUTION : Malay Peninsula, Sumatra.

ECOLOGY : There are no records on habitat or soil. *Van Steenis 6283* has been collected at 1800 m altitude. *Kloss s.n.*, Selangor, Feb. 1912, is a specimen in bud and flowers. The fruiting specimen, *Pringo Atmodjo 69*, was gathered in February and the specimen in bud, *Rahmat Si Toroos 4803*, in July.

NOTES : var. *pulverulentus* may be recognized by its large hypanthium ; by its ventrally bituberculate anthers (Pl. 2, 5) ; and by its indumentum of stellate hairs on the filament and basal half of style. It is a broad-leaved variety as var. *eberhardtii*.

I have included in it *B. tomentosus* Bakh. f. This species and *B. pulverulentus* are known only from their type specimens. It should be pointed out that the characters that make var. *pulverulentus* recognizable are known only from the type of *B. pulverulentus*, and that, lacking flowers, *B. tomentosus* has been included solely on the basis of its general resemblance with *B. pulverulentus*.

There is a resemblance in general appearance between *Kloss s.n.*, Selangor, Feb. 1912, the type of *B. pulverulentus*, and *Chevalier 38760* which is var. *eberhardtii*.

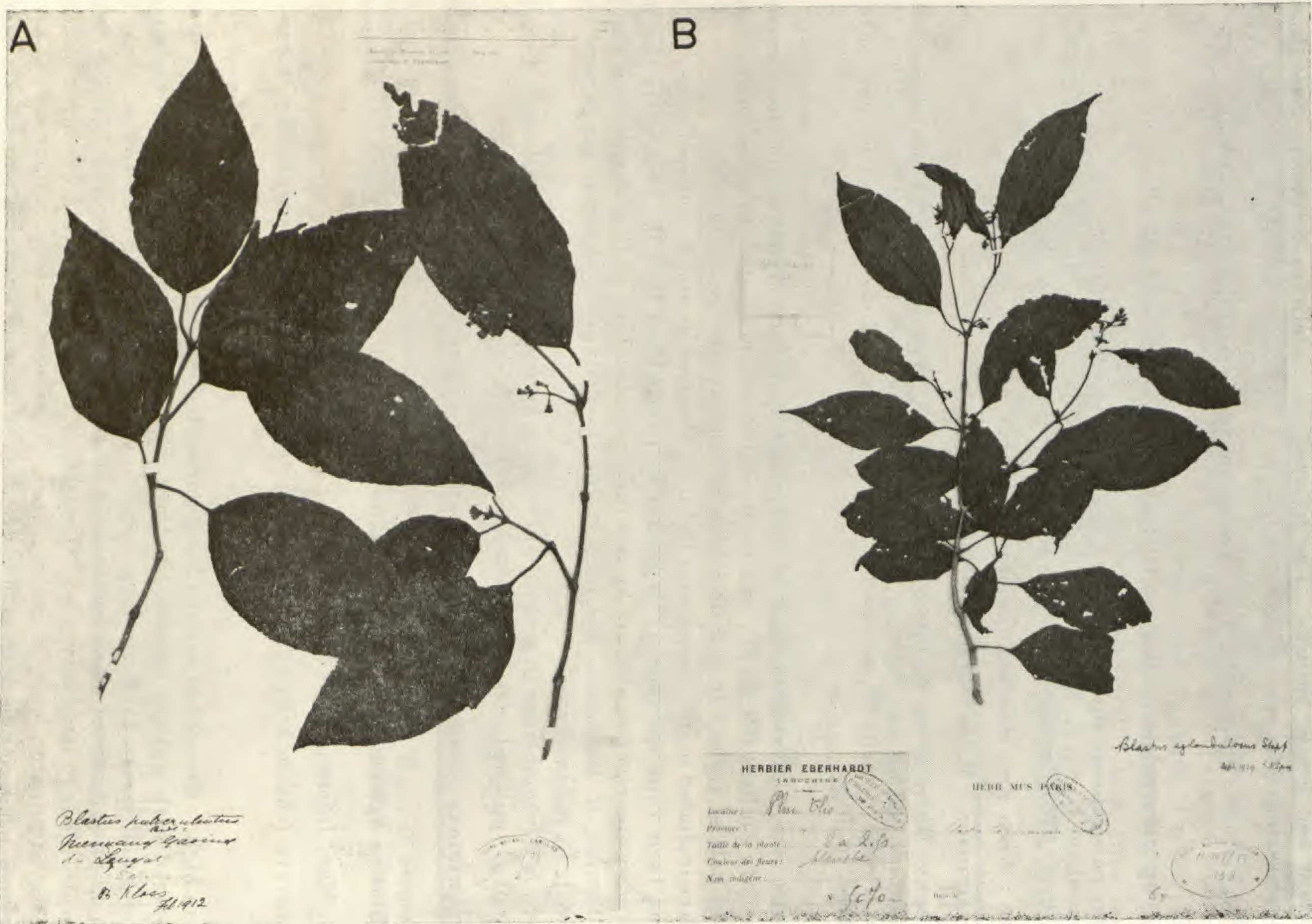
ILLUSTRATIONS : Stamen (Pl. 2, 5) ; herbarium specimen (Pl. 9, A) ; distribution (Fig. 8, B).

5. **Blastus eglandulosus** Stapf ex Spare

Bull. Misc. Inform. : 318 (1929).

LECTOTYPE (chosen here) : *Balansa 3509*, Tonkin, Mont-Bavi, P ; iso-, G, K ; photos : GH, NY, US.

2-6 m high. Branchlets subquadrangular with a few minute brownish glands or sometimes covered with a glossy varnish-like layer when young, terete and glabrous when older. Petiole of small leaves 1-1.8 cm long ; petiole of large leaves 1-1.9 cm long. Leaf-blade ovate to elliptic ; blade of small leaves 4.8-11.8 cm long, 1.9-4.1 cm wide, 2.3-2.9 times as long as wide, blade of large leaves 5-12.6 cm long, 2-4.9 cm wide, 2.2-2.6 times as long as wide ; base attenuate ; margin entire ; apex acuminate to long acuminate ; 3-nerved ; both surfaces when young with a thin vestiture of minute brownish glands or sometimes glossy from a varnish-like secrete, when older usually glabrous.



Pl. 9. — A, *Blastus borneensis* Cogn. var. *pulverulentus* (Ridley) C. Hansen; B, *B. eglandulosus* Stapf ex Spare.

Inflorescence an axillary of terminal few-flowered thyrses rarely more than 5 cm long. Pedicels 1.2-4.8 mm long. Hypanthium campanulate, ca. 3 mm long and 1.5 mm wide, glabrous, covered with a thick, glossy, varnish-like layer, sometimes becoming dull, opaque, olive. Sepals connate into a low rim, 0.2 mm high at sinuses, lobes broadly triangular with a thick pointed dorsal keel, 0.7-1 mm long. Petals irregularly ovate, ca. 3 mm long and 2 mm wide, reddish (two records) or white (one record). Filaments thick, 2-3 mm long, glabrous; anthers slightly curved, about 3 mm long, base cordate; connective distinct, glabrous. Ovary partially adnate to hypanthium for its whole length, apically slightly depressed around of base style and clothed with small gland-tipped hairs. Style 7.5-8 mm long, glabrous or with small gland-tipped hairs as top of ovary.

Fruit fusiform, base acute, ca. 3 mm long and 2 mm wide. Seeds cuneate and slightly angular with a short blunt beak at chalaza, about 0.6 mm long. Testa bullate, or tuberculate along angles, brown. Raphe a shallow furrow. Strophiole restricted to hilum area, dark brown. — Pl. 9, B.

DISTRIBUTION (Fig. 13, A) : N. Vietnam.

ECOLOGY : The few records on the habitat of *B. eglandulosus* indicate that it grows in forests. It has been gathered at 50, 800, 900 and 1000 m altitude. Specimens in bud, flower and fruit have been collected in May and in fruit in October and December.

NOTES : *B. eglandulosus* is a distinct species, though difficult to characterize. At a first sight it looks glabrous. Real hairs never occur, but minute brown glands are found on most young vegetative parts. Characteristically the very young parts, especially inflorescence branches and hypanthia, are covered with a glossy varnish-like layer. This secrete probably comes from peltate glands present in initial stages dissolving in their own secrete. The secrete sometimes becomes olive and opaque.

The stamens are similar to those of *B. cochinchinensis* (Pl. 2, 1) or *B. borneensis* var. *stellulatus* (Pl. 2, 2).

## 6. *Blastus multiflorus* (Cogn.) Guillaumin

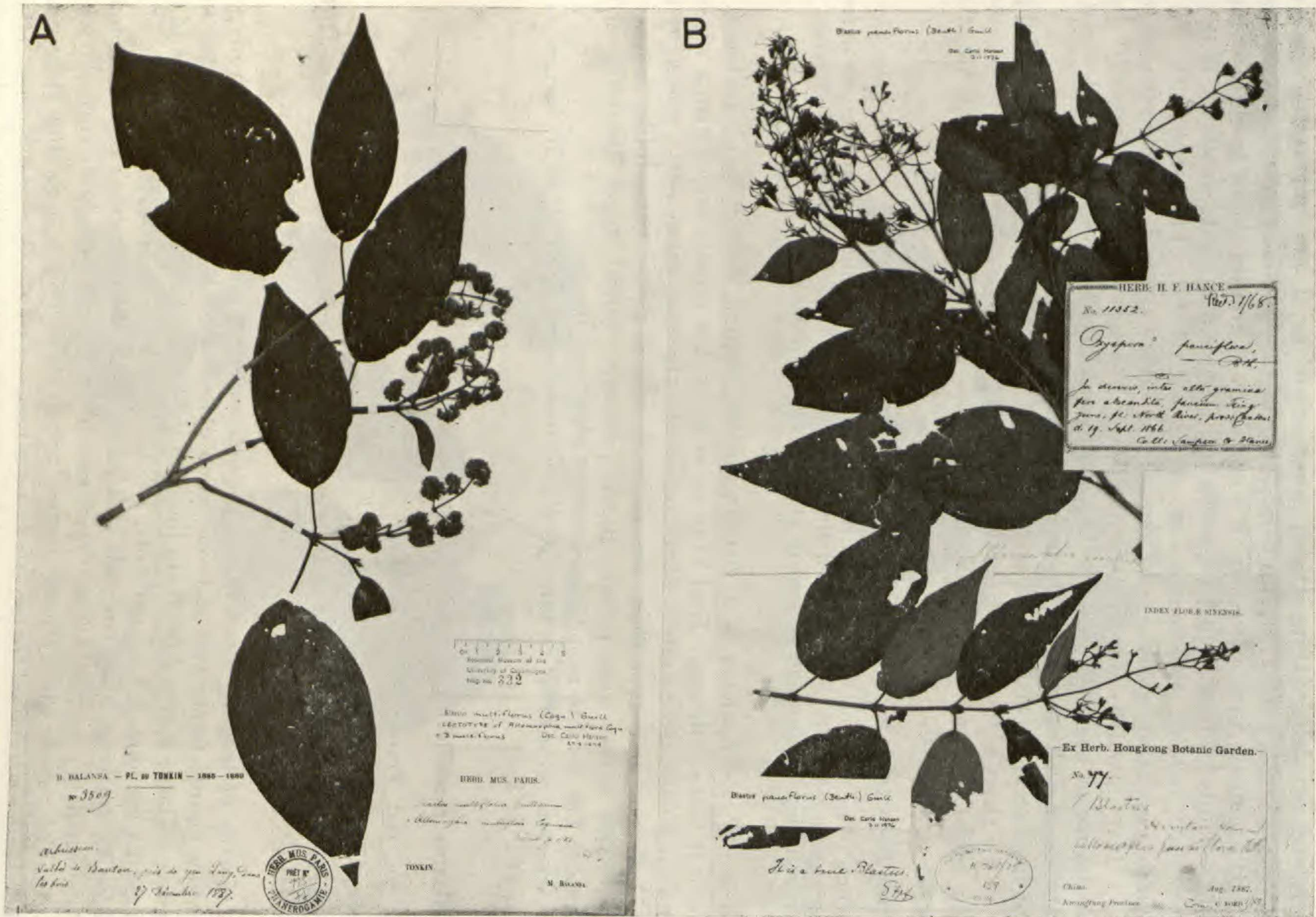
Bull. Soc. Bot. France 60 : 90 (1913).

— *Allomorpha multiflora* COGN., in A. & C. DC., Monogr. Phan. 7 : 1183 (1891).

LECTOTYPE : *Balansa* 3509, in Tonkin in sylvis ad Banton prope Yen-lang, P; iso-, BR, K; photos : GH, NY, US.

No records of height. Branchlets subquadrangular with an indumentum of peltate glands when young, terete and glabrous when older. Petiole of small leaves 1.3-2.1 cm long, petiole of large leaves 1.6-2.9 cm long. Leaf-blade ovate to elliptic; blade of small leaves 7.8-10.4 cm long, 4.3-4.5 cm wide, 1.8-2.3 times as long as wide, leaf-blade of large leaves 9.7-15.2 cm long, 5-7.8 cm wide, 1.9-2.1 times as long as wide; base rounded and minutely auriculate; margin entire; apex acuminate; 5-nerved; both surfaces with an indumentum of peltate glands when young, upper surface soon becoming glabrous.

Inflorescence a terminal thyrses, 5.5-11.1 cm long. Pedicels 0.5-1.3 mm long. Hypanthium campanulate, ca. 1.8 mm long and 1.5 mm wide, with a vestiture of peltate glands.



Pl. 10. — A, *Blastus multiflorus* (Cogn.) Guillaumin; B, *B. pauciflorus* (Benth.) Guillaumin.

Sepals very shortly connate, lobes rounded, with a conical pointed thickening dorsally, ca. 0.4 mm long. Petals unknown. Filaments thick, ca. 1.5 mm long, with a dense mass of peltate and stipitate glands dorsally on upper part; anthers much curved, about 2 mm long, base cordate; connective broad and flat with a small spur dorsally obscured by a vestiture of peltate to stipitate glands at transition to filament. Ovary partially adnate to hypanthium for about half its own length; free part rounded and slightly depressed, densely covered with peltate glands around base of style. Style 5.8 mm long, glabrous.

Fruit urceolate, base rounded, ca. 1.8 mm long and wide, breaking the hypanthium when dehiscing, placental column shortly beaked. Seeds narrowly obovate to elliptic, apically tapering to one side into a more or less curved beak, 0.5-0.7 mm long. Testa bullate or in places tuberculate, brown. Raphe probably a shallow furrow. Strophiole a narrow strand in raphe along the whole length of the seed, beak included, dark brown. — Pl. 1, 2, 3, 10.

DISTRIBUTION (Fig. 13, A) : N. Vietnam.

ECOLOGY : Information on habitat, altitude, etc. is found on two labels : *Bon 3314*, in nem. collis, 14 Dec. 1886, and *Pocs, Khoi & Tiep 1021*, in silvis rupestris calcareis tropicalis, 250 m, 25 Oct. 1963, which both are specimens in old fruit.

NOTES : I have had available only four specimens of *B. multiflorus*, three of which were specimens with old dehisced fruits, and one specimen with buds. In *Bon 3156* the only flower studied was found.

*B. multiflorus* is a distinct species easily recognizable in fruit because of its dense glomerules of dehisced fruits ending the branches of the thyse. It seems to be distinct also in flower by the dense indumentum of stipitate glands dorsally on upper part of the filament and lower part of the anther (Pl. 2, 6).

In the final stage of dehiscence characteristic of *B. multiflorus* the valves in a fruit have bent slightly away from each others and from the placentas which remain as a disengaged central shortly beaked column (Pl. 1, 5). Few remnants of the hypanthium can be found dorsally on the valves.

The branches of first or second order of the thyse is about 1-2 cm long. The glomerules ending these branches consist of a number of short branches with a few internodes less than one millimeter long. They again branch at the nodes.

## 7. *Blastus pauciflorus* (Benth.) Guillaumin

Bull. Soc. Bot. France 60 : 90 (1913).

— *Allomorpha pauciflora* BENTH., in HINDS, London J. Bot. 1 : 485 (1842).

— *Oxyspora pauciflora* (BENTH.) BENTH., Fl. Hongk. : 116 (1861).

— *Blastus hindsii* HANCE, J. Linn. Soc., Bot. 13 : 103 (1872), *nom. illeg. superfl.*

— *B. ernæ* HAND.-MAZZ., Kaiserl. Akad. Wiss. Wien, Math.-Naturwiss. Kl., Anz. 59 : 106 (1922); lectotype : *Mell 473*, Kwangtung, Kweiyang, Mandse-schan, A (chosen by HANDEL-MAZZETTI, 1934).

— *B. longiflorus* HAND.-MAZZ., *l.c.* : 106 (1922); lectotype : *Mell 474*, Kwangtung, Lung-tou-schan, Siudsao (« Schantschou »), chosen by HANDEL-MAZZETTI, 1934.

TYPE : *Hinds s.n.*, Hong Kong, 1841 (holo-, K).

1.1 m high (only record). Branchlets terete with a dense indumentum of brown one-rowed glandular hairs and some peltate glands when very young, glabrous when older. Petiole of small leaves 0.5-2.6 cm long, petiole of large leaves 1.1-3.2 cm long. Leaf-blade ovate to elliptic; blade of small leaves 4.1-13.2 cm long, 1.5-5 cm wide, 1.8-2.9 times as long as wide, blade of large leaves 7.6-14 cm long, 3-5 cm wide, 2.1-3.2 times as long as wide; base cordate or rounded and minutely auriculate; margin entire; apex acuminate; 3-nerved; both surfaces with one-rowed glandular hairs along nerves, at least at base, under surface with evenly scattered peltate glands on surface itself.

Inflorescence a terminal thyrses up to 13 cm long. Pedicels 1-3 mm long. Hypanthium urceolate to infundibular, 3.8-6 mm long, 1.4-1.8 mm wide, 2.7-3.7 times as long as wide, with yellow peltate or sometimes stipitate glands and some brownish uniseriate glandular hairs. Sepals very shortly connate, lobes triangular or rarely ligulate, thick along middle, 0.6-1.7 mm long. Petals regular, elliptic, acute, not thickened, papillate, 3.4-4.3 mm long, with a few peltate glands in bud, red to pink. Filaments 6-6.5 mm long, with uniseriate brown glandular hairs dorsally; anthers linear, slightly curved, 6.2-7.4 mm long, base sagittate; connective broad, ventrally splitting into two diverging, slightly upwards curved and bluntly attenuate lobes, adnate to and smoothly merged with anther sacs and exceeding these in two blunt points. Ovary partially adnate to it for two thirds its own length; free part rounded, not depressed apically, densely covered with peltate glands around style, less densely on the areas between the anthers in bud. Style 12-13 mm long, basal half with a thin indumentum of short uniseriate glandular hairs.

Fruit urceolate, base attenuate, about 5 mm long and 1.8 mm wide, breaking the hypanthium when dehiscing; placental column shortly beaked. Seeds cuneate to oblong with a distinct beak at chalaza, 0.5-0.6 mm long. Testa bullate or at places tuberculate to asperulate, light brown to brown. Raphe a narrow furrow. Strophiole restricted to ventral side of hilum area, brown to dark brown. — Pl. 2, 3, 10.

DISTRIBUTION (Fig. 13, A) : China (Kwangtung).

ECOLOGY : The species grows in forests in the shade or at roadsides or in meadows adjoining forests. The soil may be clay or loam. There is only one record of altitude : 545 m. Flowering specimens have been gathered in June to September and in November and December.

NOTES : The general outline of the leaf-base is rounded, but there is always a slight notch limited by small rounded lobes. Therefore the base is intermediate between rounded, cordate and auriculate.

Flowering specimens of *B. pauciflorus* are distinct by the sagittate base of the anthers (Pl. 2, 7). The basal diverging and bluntly attenuate parts are mainly a continuation of the dorsal connective. They fully clasp the filament, being shortly connate in front of it. Upwards they merge smoothly with the anther sacs.

*B. pauciflorus* is related to *B. thaiyongii* and *B. cavaleriei*. Besides by its anthers it differs by its many-celled peltate glands with entire margin. The two latter species have few-celled glands with crenate margin. In *B. cavaleriei* the glands are smaller and darker yellow than in *B. pauciflorus* and *B. thaiyongii*, and on the lower surface of the leaves they occur preferably on the distinct nerves of third order. In the other two species they show no preference for the nerves of third order, but are evenly scattered on the under



surface. *B. cavaleriei* also differs by its ligulate sepals (Pl. 1, 6). A few specimens of *B. pauciflorus* show that character also, by which *B. cavaleriei* is otherwise readily recognized in bud, flower and fruit.

*B. pauciflorus* is most closely related to *B. thaiyongii*. Habitually they are much alike, but *B. thaiyongii* differs from *B. pauciflorus* by having smaller floral parts (hypanthium in flower and fruit, filaments, anthers and style) and by the non-sagittate base of the anthers. Besides in *B. thaiyongii* the number of radiating cells of the peltate glands are higher than in *B. pauciflorus* and the margin is crenate.

8. **Blastus thaiyongii** C. Hansen, *sp. nov.*

*B. paucifloro peraffinis, sed antheris non sagittatis et partibus floralibus minoribus differt.*

TYPE : *Dalziel s.n.*, Thai-Yong, a mountain valley, sixty miles west from the Port of Swatow, July 1901 (holo-, E).

0.6 m high (two records). Branchlets terete, with a dense vestiture of pale brownish-green uniseriate glandular hairs and some peltate glands when young, glabrous when older. Petiole of small leaves 0.3-0.7 mm long, petiole of large leaves 0.6-2.1 mm long. Leaf-blade ovate; blade of small leaves 2.2-5 cm long, 1.1-2 cm wide, 2-3.1 times as long as wide, blade of large leaves 5.5-9 cm long, 2.1-3.8 cm wide, 2.2-2.7 times as long as wide; base rounded or rarely cordate, minutely auriculate; margin distantly serrulate; apex attenuate; 3-nerved; upper surface with a vestiture of pale brownish uniseriate glandular hairs, at least on nerves, under surface with evenly scattered peltate glands and also uniseriate glands at least on nerves.

Inflorescence a terminal thyrses up to 8 cm long. Peduncles 0.5-1.8 cm long. Bracts minute, caducous. Pedicels 1.4-2.7 mm long, longest in fruit. Hypanthium infundibular, thin-walled, 2.7-3.5 mm long, 0.9-1.7 mm wide, with a few pale brown uniseriate hairs and more densely with yellow peltate glands. Sepals connate into a low rim, 0.1-0.2 mm high at sinuses, lobes triangular, thick along middle and bluntly pointed close to apex, 0.5-0.7 mm long. Petals elliptic, 2.2-3.2 mm long, 1.4-1.7 mm wide, lavender (according to the only record). Filaments 4-4.8 mm long, with a thin indumentum of gland-tipped patent hairs; anthers narrow, slightly curved, 4-4.5 mm long, base cordate, connective broad, inappendiculate or tuberculate dorsally, more or less biauriculate ventrally. Ovary partially adnate to hypanthium for about two thirds its own length, free part rounded, not depressed around style, with yellow peltate glands. Style 7-8 mm long, with some patent gland-tipped hairs on basal half.

Fruit elliptic or urceolate, base acute, 3.5-3.8 mm long, 1.6-1.8 mm wide, 2.1 times as long as wide, top of valves thin, breaking the hypanthium when dehiscing; placental column shortly beaked. Seeds cuneate with a short blunt beak at chalaza, about 0.4 mm long. Testa bullate, light brown. Raphe a narrow furrow. Strophiole restricted to ventral side of hilum area, brown. — Pl. 2, 11.

DISTRIBUTION (Fig. 13, A) : China (Kwangtung).



ECOLOGY : The few records indicate that *B. thaiyongii* grows in woods on silt or sand. There are two records of altitude : 600 and 700 m. Flowering and fruiting specimens have been collected in July and September.

NOTES : See under *B. pauciflorus*.

### 9. *Blastus cavaleriei* A. Lévillé

Mém. Soc. Sci. Nat. Cherbourg 35 : 395 (1906).

- *Blastus dunnianus* A. LÉVEILLÉ, Feddes Repert. Spec. Nov. Regni Veg. 9 : 449 (1911) ; type : *Cavalérie 2971*, Kouy-Tchéou, Majo (A, E, K, P).
- *B. spathulicalyx* HAND.-MAZZ., Kaiserl. Akad. Wiss. Wien, Nath.-Naturwiss. Kl., Anz. 59 : 107 (1922) ; type : *Handel-Mazzetti 10913*, Kweitschou orient., inter urbes Kutschou et Liping ad margines silvarum circa vicus Dayung et Matang (A, W).
- *B. spathulicalyx* HAND.-MAZZ. var. *apricus* HAND.-MAZZ., *l.c.* : 107 (1922) ; type : *Mell 638*, Kwangtung, in silva ad austro-occ. jugi Tsatmukugao prope oppidum Lienpieng ad bor.-or. urbis Kanton (photo, A).
- *B. apricus* (HAND.-MAZZ.) LI, J. Arnold Arbor. 25 : 19 (1944).
- *B. lii* NAYAR, Curr. Sci. 37 : 413 (1968), *nom. nov.* for *B. tomentosus* LI ; type : Kwangsi, Tong Shan (along Kwangtung border), near Sap-luk Po Village, Waitsap Distr. (holo-, A ; iso-, G, P, W).
- *B. tomentosus* LI, *non* БАКН. f., J. Arnold Arbor. 25 : 18 (1944), *nom. illeg.*, later homonym.

TYPE : *Cavalérie 2676*, Kouy-Tchéou, Tou Chan (holo-, E) ; photo, A.

0.5-1.7 m high. Branchlets slightly flat to terete with a dense low brownish indumentum of branched uniseriate glandular hairs and some peltate glands, rarely also with patent multiseriate gland-tipped hairs when young, terete and more or less glabrous when older. Petiole of small leaves 0.6-2.1 cm long, petiole of large leaves (0.6-) 1.2-2.4 cm long. Leaf-blade ovate ; blade of small leaves (6.6-) 8-14.2 cm long, 3.2-6.7 cm wide, 1.9-2.3 (-3.6) times as long as wide ; blade of large leaves (7.3-) 9.5-17.3 cm long, 3.7-7.7 (-9.5) cm wide, 1.8-2.6 (-3.1) times as long as wide ; base rounded to cordate ; margin entire or rarely distantly serrulate ; apex acuminate ; 5-nerved ; both surfaces with some branched uniseriate glandular hairs at least along nerves, under surface also with peltate glands.

Inflorescence a terminal thyrse from 5.4-11.8 cm long. Pedicels 2-4.5 mm long. Hypanthium narrowly campanulate, thin-walled, 3.4-5.5 mm long, 1.3-2.1 mm wide, 2-3.8 times as long as wide, with yellow peltate glands and minute brown glandular hairs. Sepals very shortly connate, lobes ligulate, thin, 2.1-2.7 mm long, 0.9-1.1 mm wide. Petals ovate, not thickened, glabrous, purplish red. Filaments 4-7.4 mm long, glabrous ; anthers narrow, slightly curved, 4.7-6.8 mm long, base cordate ; connective distinct, usually with a small tubercle dorsally. Ovary partially adnate to hypanthium for almost the whole of its length, apically with 4 low humps, with an indumentum of short thin gland-tipped hairs. Style 7.5-14.3 mm long, glabrous or rarely with small thin gland-tipped hairs on basal half.

Fruit urceolate to fusiform, base attenuate, 4-6 mm long, 2-3.5 mm wide, not breaking the hypanthium when dehiscing, placental column shortly beaked. Seeds narrowly cuneate to oblong to elliptic with a collapsed beak at chalaza, 0.6-1.1 mm long. Testa bullate to

tuberculate, brown. Raphe a furrow, rarely closed. Strophiole at ventral side of base, darker brown than testa. — Pl. 1, 2, 11.

DISTRIBUTION (Fig. 13, B) : China (Kwangtung).

ECOLOGY : The species grows in forests in the shade or by roadsides or streams. The soil may be silt, clay or sand. *B. cavaleriei* has been collected at altitudes from 410-780 m (three records). Flowering specimens have been gathered in June and July, fruiting ones in June to November.

NOTES : A rare indumentum in *B. cavaleriei* is patent gland-tipped hairs sometimes found on branchlets, petioles and less densely on longitudinal nerves beneath (see for instance *Tsang 20827* and *22792*). See also notes under *B. pauciflorus*.

#### TWO RECENTLY DESCRIBED SPECIES

Very late in my work on *Blastus* I noticed in Flora Yunnanica the two new species *B. squamosus* C. Y. Wu & Y. C. Huang and *B. auriculatus* Y. C. Huang. Having since studied the types I agree that the species are distinct from all other *Blastus* species.

Because of their recent publication I decided not to work out descriptions myself, but to give a translation into English of the Chinese descriptions in Flora Yunnanica. C. CHEN very kindly did the translations, and I give them here with his permission.

#### 10. *Blastus squamosus* C. Y. Wu & Y. C. Huang

Fl. Yunn. 2 : 101, pl. 26, 6-7 (1979).

TYPE : C. W. Wang & Y. Liu 89707, Yunnan, Funing, 29.5.1940 (holo-, HY).

A much branched shrub 1 m high, with cylindric stem, dense cover of peltate glands. Leaves papery, narrowly elliptic or lanceolate-elliptic, at the base cuneate, at the apex acuminate, 5.5-11 cm long, 2-3.5 cm broad, margins with very small teeth, 3-nerved, the upper surface covered only with papillae, main nerves somewhat concave, the lower surface covered with peltate glands, main nerves convex ; petiole 0.6-1.5 cm long, densely covered with peltate glands. Inflorescence terminal, panicle composed of the compound cymes, with 20-30 flowers, about 8 cm long, inflorescence, pedicel and calyx all covered with peltate glands ; bracts triangular, about 0.5 mm long ; pedicels very short or nearly absent. Calyx cylindric, (3) 4-angled, 5 mm long, lobes 4, rarely 3, triangular, 0.5 mm long. Petals 4, rarely 3, oblong (in flower bud), pinkish, at the apex obtuse or round, 1.5 mm long. Stamens 4, rarely 3, filaments 1 mm long (in flower bud), anthers 4 mm long, connective not swelled. Ovary ovate, adherent to the calyx-tube for about 2/5 of its length, at the apex with 4 small tubercles, covered with peltate glands. Fruit unknown, flowering time May. — Fig. 13, A ; Pl. 43.

HABITAT : This species has been collected in the mountain forests, at 700 m altitude.

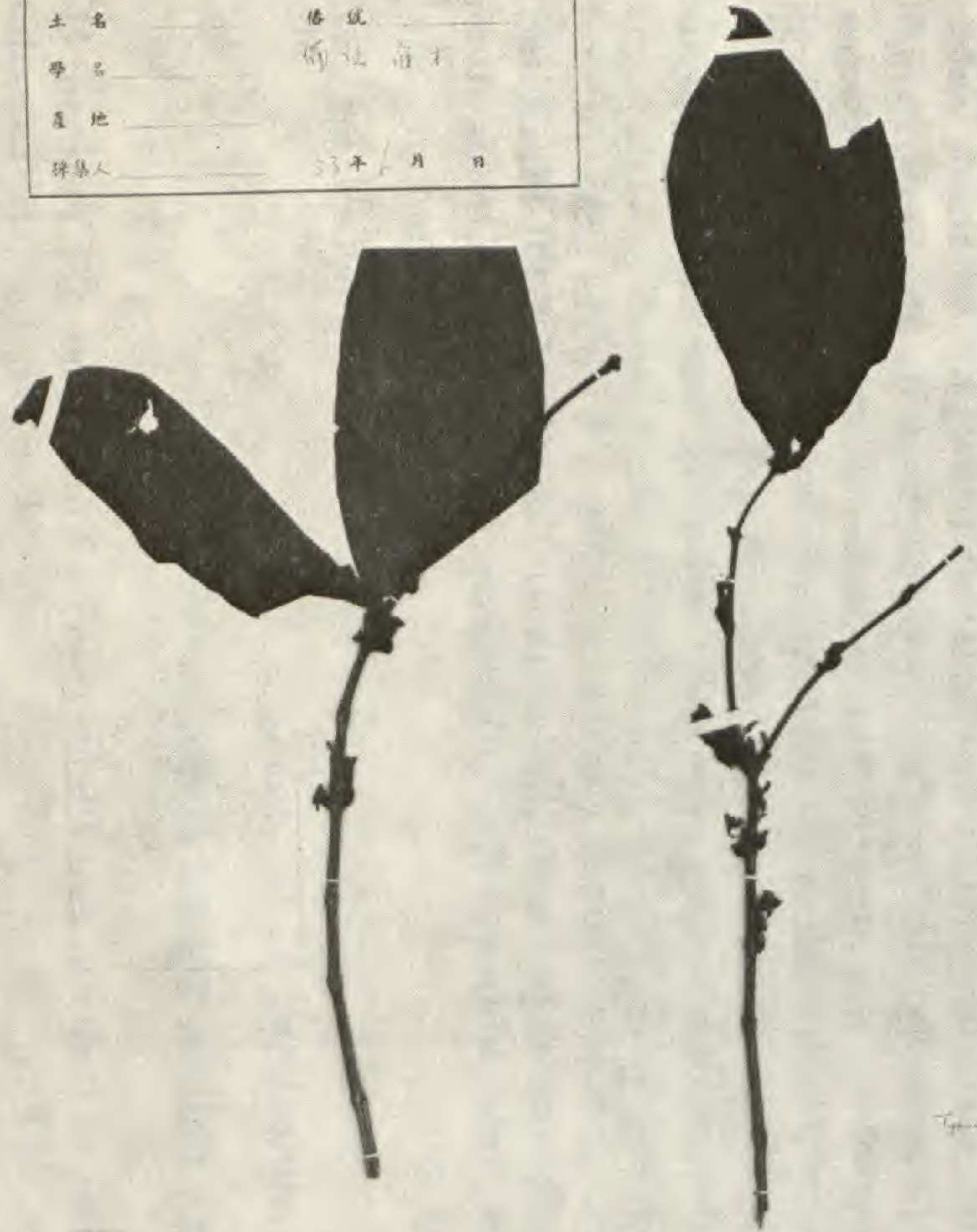
**A** 中国科学院植物研究所昆明工作站  
**云南植物**  
 采集日期 1962.1.29  
 产地 景东  
 海拔高度 1000m  
 环境 林下  
 科 芸香科  
 属 刺楸属  
 种 刺楸  
 其他 182  
 采集人 吴中瑜



Scale bar: 0 1 2 3 4 5 cm  
 Botanical Museum of the University of Copenhagen  
 Reg. no. 305

*Blastus squamosus* C. Y. Wu & Y. C. Huang  
 sp. nov.  
 Determined 1967.2.

**B** 云南垦殖局  
 景东 景东河 牛栏 三 区 景东 海拔  
 编号 182 林班  
 土名 传统  
 学名 刺楸  
 产地  
 采集人 1962年 月 日



Scale bar: 0 1 2 3 4 5 cm  
 Botanical Museum of the University of Copenhagen  
 Reg. no. 306

*Blastus auriculatus* Y. C. Huang  
 sp. nov.  
 Determined 1967.2.

中国科学院  
 昆明植物研究所  
 标本室

Pl. 12. — A, *Blastus squamosus* C. Y. Wu & Y. C. Huang; B, *B. auriculatus* Y. C. Huang.

NOTES : It appeared that *Ching 6945* (A, NY, US), which otherwise I could not refer to any species, belongs to *B. squamosus*. I had decided not to describe it as it was a specimen in mature fruit, but only to make a note on it saying that it is certainly related to *B. pauciflorus*, *B. thaiyongii* and *B. cavaleriei*, differing by its acute leaf base, by its few flowered lax and somewhat nodding infrutescence and by its seeds, which apically have a hollow prolongation. Having seen the type I still consider the species related to the above three species, rather than to *B. cochinchinensis* as given in the diagnosis. This problem may be solved when flowering specimen will be available.

To CHEN's description can be added the following note on the fruit and a description of the seeds :

Fruit elliptic. Seeds narrowly cuneate to oblong with no beak or an indistinct beak at chalaza, apically prolonged and filled with air, usually 1.1-1.3 mm long, but some less than 1 mm long, light brown. Raphe a furrow. Strophiole a thin strand along basal part of raphe, brown.

11. ***Blastus auriculatus*** Y. C. Huang

Fl. Yunn. 2 : 103, pl. 26, 4-5 (1979).

TYPE : Bureau of Reclaim and Plantation of Yunnan no. 43, Yunnan, Hekou (Hokow), June 1953 (holo-, HY).

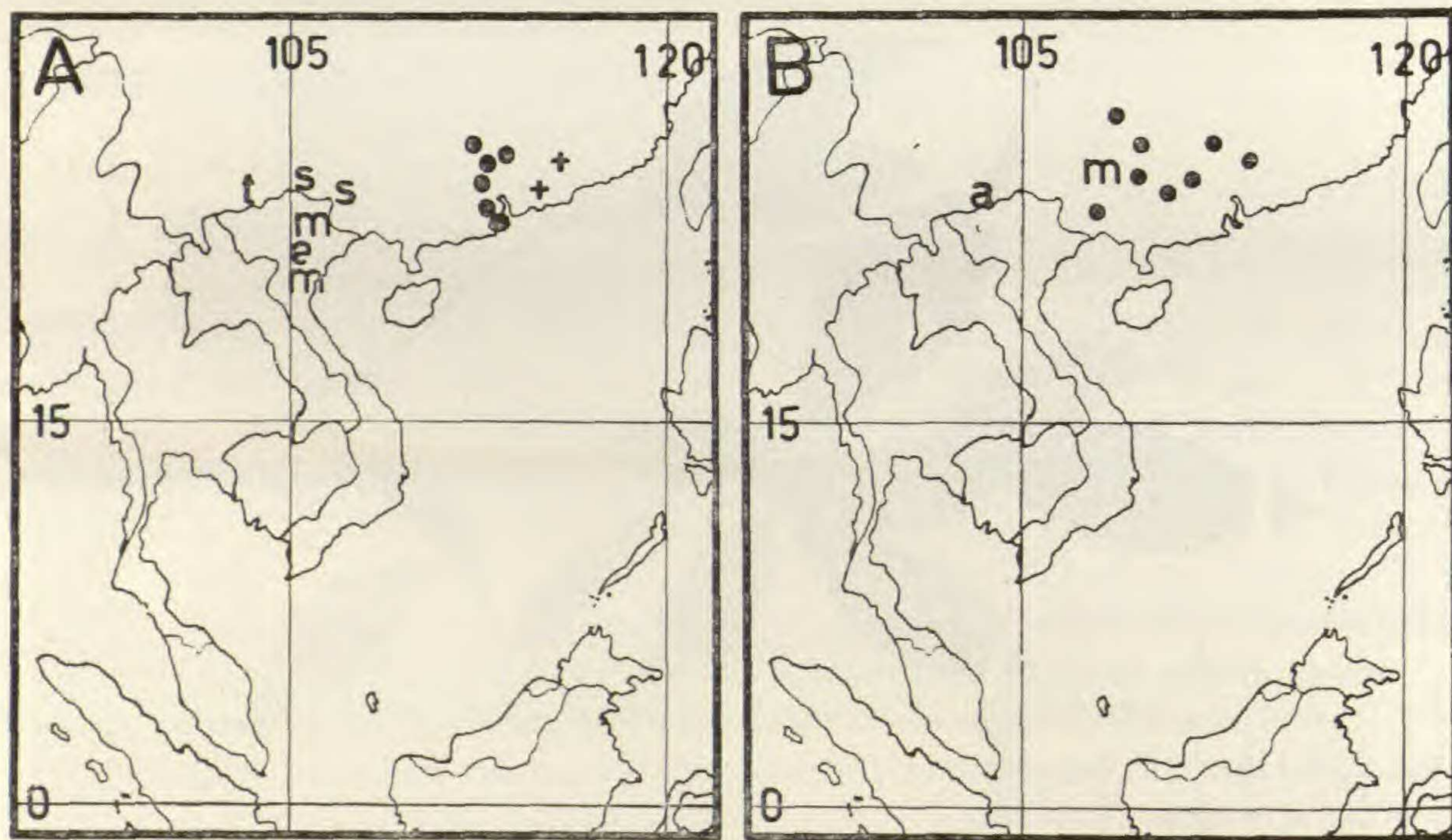


FIG. 13. — Total distributions. A : ●, *Blastus pauciflorus* (Benth.) Guillaumin ; +, *B. thaiyongii* C. Hansen ; m, *B. multiflorus* (Cogn.) Guillaumin ; e, *B. eglandulosus* Stapf ex Spare ; t, *B. tsaii* Li ; s, *B. squamosus* C. Y. Wu & Y. C. Huang. — B : ●, *B. cavaleriei* A. Lévillé ; a, *B. auriculatus* Y. C. Huang ; m, *B. mollissimus* Li.

A much branched shrub with cylindric stem. Young branches usually densely covered with peltate glands. Young leaves covered on both sides with peltate glands, afterward glands fallen away except on main nerves; blade papery, fiddle-elliptic, at the base auriculate, at the apex acuminate, 13.5-24 cm long, 4.5-8 cm broad, margins entire, nearly sessile, 3-nerved, nerves elevated on under side. Inflorescence axillary, pedicel and calyx covered with peltate glands, pedicels about 2 mm long. Calyx funnel-shaped about 3.5 mm long, having a slightly sinuous margin, 4-toothed, mucronate, tooth about 0.5 mm long. Petals white, ovate, about 2.2 mm long, at the apex acuminate, glabrous. Stamens 4 of the same length, filaments about 2 mm long, anthers narrowly lanceolate, about 3.5 mm long, reddish, connective prolonged into a short collar, ventrally mucronate. Ovary adherent to the calyx-tube for about 2/5 of its length, at the apex 4 little tubercles, more or less covered with glands. Capsule elliptic, calyx persistent, longer than the capsule, at the middle contracted, about 3.5 mm long, 2 mm diam., densely covered with peltate glands. Flowering in June. — Fig. 13, B; Pl. 12.

**HABITAT**: This species has been collected in forests or in growth of bamboos in the mountains, at 200 m altitude.

#### DOUBTFUL SPECIES

**Blastus setulosus** Diels, Bot. Jahrb. Syst. 65 : 106 (1932); type: *Sin & Whang 686*, Kwangsi, Yao Shan (not seen).

**Blastus tenuifolius** Diels, Bot. Jahrb. Syst. 65 : 105 (1932); type: *Sin 3742*, Kwangsi, Yao Shan (not seen).

No material has been available of the above two species. According to the protologues they do belong to *Blastus*, unless the squamulose glands mentioned there are not true *Blastus* glands. Because of the sessile axillary inflorescence they are probably related to *B. cochinchinensis* and *B. mollissimus*. They may even be conspecific with the latter (see notes there).

#### EXCLUDED NAMES

*Blastus fengii* Hu = **Sporoxeia latifolia** (Li) C. Y. Wu & Y. C. Huang, Flora Yunnanica 2 (1979).

*Blastus hirsutus* Li = **Sporoxeia hirsuta** (Li) C. Y. Wu, Flora Yunnanica 2 (1979).

*Blastus hispidissimus* Ridley, Kew Bull. : 33 (1946) = **Anerinoleistus hispidissimus** (Ridley) C. Hansen, *comb. nov.*; lectotype (chosen here): *Hose 161*, Entoyut River, Baram Distr., Sarawak, E; iso-, BM.

*Blastus latifolius* Li = **Sporoxeia latifolia** (Li) C. Y. Wu & Y. C. Huang, Flora Yunnanica 2 (1979).

*Blastus lyi* A. Lévillé = **Fordiophyton faberi** Stapf.

*Blastus mairei* A. Lévillé = **Bredia yunnanensis** (A. Lévillé) Diels.

*Blastus membranifolius* Li = **Neodriessenia membranifolia** (Li) C. Hansen (1980).

*Blastus yunnanensis* A. Lévillé = **Bredia yunnanensis** (A. Lévillé) Diels.

ACKNOWLEDGEMENTS : I wish to thank anyone who has helped in the preparation of this manuscript by typing, by operating the scanning electron microscope, by making photographic prints etc. CHEN CHEIH, Kunming, has provided the English translations of the descriptions of *B. auriculatus* and *B. squamosus*. Anne Fox MAULE, Copenhagen, has translated into Latin the diagnosis of *B. thaiyongii*. The following herbaria have kindly lent herbarium material : A, ABD, BM, BR, E, G, HBG, HY, K, KLU, KYO, L, NY, P, PE, S, SAR, UPS, US, W.

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#### INDEX TO SPECIMENS

au	<i>B. auriculatus</i>	eg	<i>B. eglandulosus</i>
bo	<i>B. borneensis</i>	mo	<i>B. mollissimus</i>
bo-eb	<i>B. borneensis</i> var. <i>eberhardtii</i>	mu	<i>B. multiflorus</i>
bo-pu	<i>B. borneensis</i> var. <i>pulverulentus</i>	pa	<i>B. pauciflorus</i>
bo-st	<i>B. borneensis</i> var. <i>stellulatus</i>	sq	<i>B. squamosus</i>
ca	<i>B. cavaleriei</i>	th	<i>B. thaiyongii</i>
co	<i>B. cochinchinensis</i>	ts	<i>B. tsaii</i>

*d'Alleizette s.n.*, Tonkin, Mont Bavi, Juill. 1908 (bo) (L) ; *s.n.*, rég. de Chau Doc, Juin 1909 (bo) (P) ; *s.n.*, Cambodge, forêt de Pnom Penh, Juin 1909 (bo) (P) ; *s.n.*, Cochinchine, env. de Bien Hua, Juin 1909 (bo) (L) ; *s.n.*, Tonkin, env. de Ninh-Vinh, Mai 1909 (bo-eb) (L) ; 2416 (pa) (L) ; 2419 (co) (L) ; Ashton 13983 (bo) (K, L, SAR) ; 19793 (bo) (K, L, SAR) ; Atmodjo 69 (bo-pu) (L) ; Balansa 1424 (co) (A, BR, G, P) ; 3505 (co) (K, P) ; 3508 (co) (K, P) ; 3509 (mu) (BR, GH, K, NY, P) (type) ; 3516 (eg) (P) ; 3517 (eg) (G, GH, K, NY, P) (type) ; 3521 (co) (L, P) ; 4054 (co) (G, K, P, US) ; Balgooy 2608 (bo) (NY) ; Banying ak Nyodong 19178 (bo) (L, SAR) ; Barnard 20 (co) (BM) ; Bartlett 6735 (bo) (G, K, L, NY, US) ; Beccari 1403 (bo) (BR, FI, K, P) (type) ; Beusekom & Phengkhlai 864 (bo-st) (AAU, C, K, L, P) ; Bodinier 2170, see *Cavalerie* ; Bon 3314 (mu) (P) ; 4791 (mu) (P) ; Brandis *s.n.*, Nambar Forest, Solaghat, March 1879 (co) (HBG) ; Brooke 9746 (bo) (G, L, SAR) ; Bünnemeyer 1141 (bo) (L) ; 3206 (bo) (L, P, W) ; 5361 (bo) (L) ; Bureau of Reclamation and Plantation of Yunnan 43 (au) (HY) (type) ; Canton Christian College 93 (co) (GH, US) ; 1462 (pa) (A) ; 3090 (co) (A, G) ; 12617 (pa) (A, E, P, S, US, W) ; 12891 (pa) (A, E, P, S, US, W) ; *Cavalerie s.n.* (or 2971 ?), Chine : Kouy-Tchéou, Ma-jo, VII.08 (ca) (E) (type ?) ; *s.n.*, Kouy-Tcheou (ca) (P) ; herb. Bodinier 2170 (ca) (P) ; 2676 (ca) (A, E) (type) ; 2971 (ca) (A, E, K, P) (type) ; 3609 (co) (P) ; Chao 1692 (ca) (PE) ; C. Chen 91338 (co) (A) ; L. Chen 67 (co) (A) ; Chevalier 38760 (bo-eb) (P) ; Chew Wee-Lek 374 (bo) (E, G, K, SAR) ; Chew, Corner & Stainton 504 (bo) (A, K) ; 1194 (bo) (K) ; Ching 6555 (co) (NY, US) ; 6945 (sq) (A, NY, US) ; 8382 (ca) (A, NY, US) ; Chuang 3166 (co) (L, NY) ; 3884 (co) (L, NY) ; N. K. Chun & Tso 43907 (co) (NY, W) ; W. Y. Chun 5570 (pa) (E) ; 5751 (pa) (A) ; 6330 (co) (A, US) ; 6504 (co) (A, US) ; 6555 (co) (A) ; 7381 (pa) (E) ; H. H. Chung 1374 (co) (A, E, K) ; 2969 (co) (A, BM, E, K, W) ; 3317 (co) (A, E, K, W) ; 3702 (co) (A) ; 6865 (co) (A) ; Chin See



*Chung* 599 (bo) (KLU) ; *Z. S. Chung* 38552 (ca) (A) ; 81771 (ca) (A) ; *Clemens* 3255 (bo) (P) ; 3418 (bo-eb) (G, P, W) ; 4033 (bo) (K, NY, P) ; 4285 (bo-eb) (P) ; 7707, see 20928 ; 10337 (bo) (A) ; 20928 (bo) (A, K, L, NY, P, SAR) ; 27064 (bo) (A, G, K, L, NY) ; 27837 (bo) (A, G, HBG, K, NY) ; 30284 (bo) (A, G, HBG, K, L, NY) ; 30285 (bo) (A, G, K, L, NY) ; 30343 (bo) (A, G, HBG, K, L, NY) ; 31060 (bo) (A, L, NY) ; 31386 (bo) (NY) ; 32420 (bo) (A, G, HBG, K, L, NY) ; *Clarke* 37904 (co) (G, K) ; *Cockburn* 7461 (bo) (K, L) ; *collector in Chinese* 00204 (bo) (PE) ; 00208 (co) (PE) ; 00718 (ca) (PE) ; 1027 (co) (PE) ; 1203 (ca) (PE) ; 2419 (ca) (PE) ; 4223 (ca) (PE) ; 7370 (pa) (PE) ; 7481 (pa) (PE) ; 8604 (pa) (PE) ; 8718 (co) (PE) ; 12050 (co) (PE) ; 58152 (ca) (PE) ; 808597 (ca) (PE) ; *Corner* 29304 (bo) (A, K) ; 30655 (bo) (K, S) ; *Dalziel s.n.*, Swatow, Thai-Yong, 15.9.1898 (th) (E, K) ; *s.n.*, China, Swatow, Thai-Yong, 5.9.1899 (co) (E) ; *s.n.*, Swatow, Thai-Yong, Jul. 1901 (th) (E) (type) ; *Döderlein s.n.*, Liu-kiu, Amemi, Osima (co) (BR) ; *Dunn* 345 see *Hong Kong herb.* 2708 ; *Eberhardt* 2031 (bo) (P) ; 2796 (bo) (E, P) ; 3660 (eg) (P) ; 4955 (bo-eb) (P) (type) ; 5031 (bo-eb) (P) (type) ; 5070 (eg) (K, P) syntype ; *Elbert* 3205 (bo) (A, L) ; *Endert* 3132 (bo) (A, K, L) ; 3909 (bo) (A, K, L) ; *Esquirol* 967 (co) (A, E, G) (type) ; 6433 (co) (P) ; *Faurie* 73 (co) (P, W) ; 434 (co) (P, W) ; 3805 (co) (A, G, P) ; *Ford s.n.*, Hainan, 30.5.1893 (co) (NY, US) ; 77 (pa) (K, P) ; *Furuse s.n.*, Isl. 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